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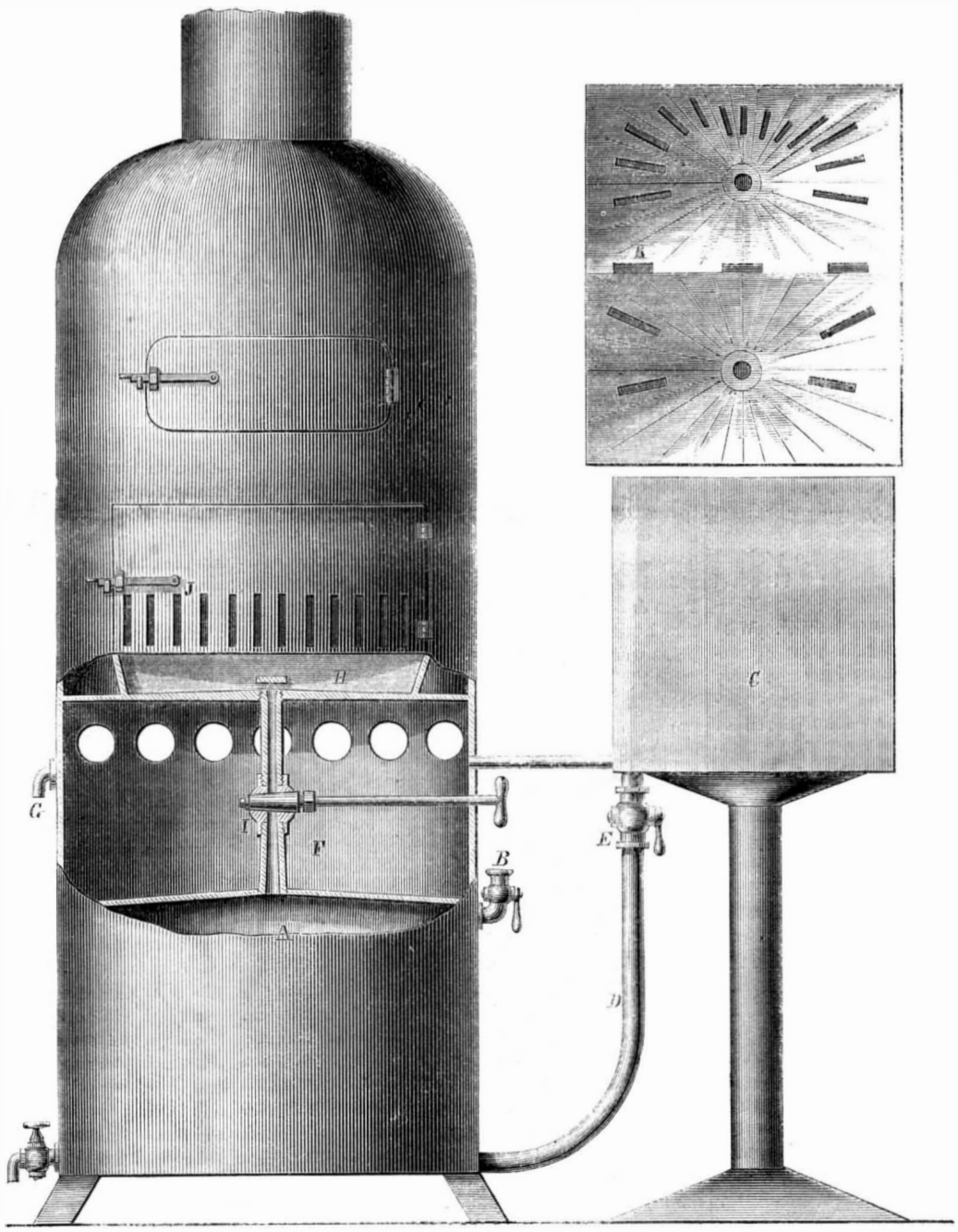
Apparatus for Burning Petroleum.

This engraving represents a plan for burning petroleum to heat water either for generating steam or for culinary purposes. The method employed is to allow the petroleum to flow into a vessel containing sand or fire-clay, on the surface of which it is ignited and burns steadily without creating smoke. This sand supplies the place of a wick in a lamp, and the vessel containing it is placed directly underneath the boiler, as common furnaces are. The oil is forced up to the pan by water pressure. The details are as follows:—

The oil chamber, A, is supplied with oil through the pipe, B, and there is a reservoir, C, which is filled with water. This reservoir communicates by the pipe, D, with the oil chamber, and its flow is controlled by the cock, E. There is also a compartment, F, above the oil chamber, which is also filled with water to keep the oil cool; this water rises no higher than the outlet, G. The fire pan containing the sand is at H, and communicates with the oil chamber by the pipe, I. The bottom of the pan is slightly inclined so as to diffuse the oil evenly all round, being also furnished with grooves, as in Fig. 2, for that purpose. There are holes, J, in the furnace door, and also air pipes, K, through the bottom of the pan to admit air to the flame.

These are the principal parts. Water is let into the chamber or reservoir, A, so as to cover the inlet pipe for oil, and the latter fluid is then filled in, as before described; being lightest it floats on the surface until it finally rises through the central pipe into the sand box or fire pan. The sand is completely saturated with the oil, which burns freely when ignited, creating an intense heat. There is no danger of accidental explosion with this apparatus, for the oil is entirely covered or surrounded by water.



M'KINNEY'S APPARATUS FOR BURNING PETROLEUM.

It is claimed to be applicable to stoves for culinary purposes, and also to land or marine engine boilers. In the case of the land engine, the oil chamber may be removed to a distance from the fire box, as in the yard, for instance, where a special building could be constructed for the purpose, and the oil pipe could be carried under ground.

On board of a ship the oil chamber might be in the hold or near the keel, and the water reservoir on deck. The petroleum in this way might be kept in tanks covered with water, remote from fire and where nothing but design could set it on fire. It could also be supplied to the fire without exposure to sight, touch or smell. A model of this invention will be on exhibition, says the inventor, at the Fair of the American Institute.

For further information address E. McKinney, at Box 372, Clarksville, Tenn., by whom it was patented through the Scientific American Patent Agency on July 25, 1865.

Paterson Locomotives.

An anonymous correspondent, writing from Paterson, says:—The heaviest engines turned out of Paterson, however, are those built for the Baltimore and Ohio Railroad by the New Jersey Co., and which are 19½-inch cylinders, 22-inch stroke, with 8 coupled wheels, and flues 15 feet long by 2½ inches in diameter. Paterson shops are not behind in the size of their engines, and the quality of their work will speak for itself.

A New Plan for Raising the Atlantic Cable.

Louis Olin writes to the London *Morning Star:*—"After the return of the *Great Eastern* I conceived a plan for fishing out the cable. I submitted it to some friends of mine, among whom was a scientific gentleman. They found it so practicable that they advised me to publish it. I proposed to start three ships instead of one, each ship having a wire rope of great strength attached to the stern, of at least three miles in length. At the end of this rope I would attach a thick ring, weighing several hundred pounds, through which the end of the cable at Valentia should be passed; the ships would then be obliged to follow the cable, as the least deviation would be indicated by the angle described by the ropes. The ships would be from two to three miles apart, the *Great Eastern* in the middle; and, when within ten or fifteen miles of the broken end of the cable, would, by a signal from the *Great Eastern*, stop and begin the winding up. When the cable is raised a mile high, the first and third ships would stop, leaving the *Great Eastern* to finish the work; by this means the slack of at least six or seven miles of the cable would be available to raise it to the surface of the water, even if the depth were two miles."

[This plan may seem plausible at first sight, but a very little reflection will show it to be impracticable. In any considerable depth of water the lower end of the line carrying the ring would lie along the bottom of the ocean, and the ring would rest flat on the ground, with the cable bending through it and pressing it hard on two sides. In these circumstances no power could drag the ring along, and, if all the tackle should hold, the *Great Eastern* would be effectually anchored in mid ocean.—EDS.

A LARGE CYLINDER.—A cylinder of 100 inches in diameter—the largest ever cast at the navy yard in Washington—was successfully cast recently. The amount of metal used was 58,000 lbs; time of running into the mold, three minutes and a quarter.

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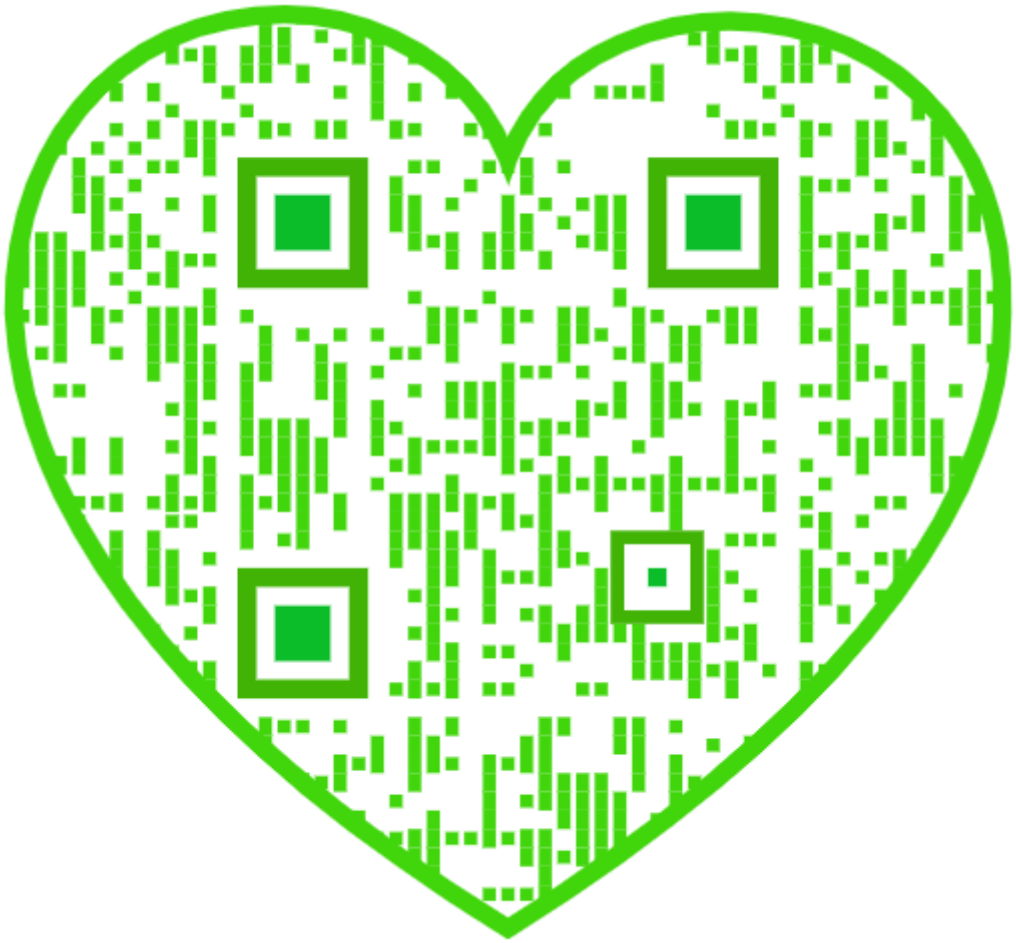

THE GREAT ENGLISH MACHINE WORKS.

The private iron ship-building works of England are of three classes. 1. Those that manufacture within one inclosure every part of a ship, including armor plates for iron-clads. 2. Those that manufacture steam machinery for ships. 3. Those that confine themselves to rolling armor plates and every kind of rolled work.

PRIVATE IRON SHIP YARDS.

There are in England two immense private establishments for the construction of iron ships, each as extensive as a government dockyard, and each containing appliances more modern and elaborate than any to be found in the public yards. The chief of these is the Mill Wall Works, formerly owned by Scott Russell, Esq., builder of the *Great Eastern*. The works cover 27 acres and have a water front of 1,900 feet. There are 4,500 men employed in the yard, and the business is conducted on a capital of $2,500,000. The yard is divided into two parts by the public street, the one on the river bank containing the vessels under construction, and the other having the machine shops, founderies, etc. The works are not all modern nor are they advantageously arranged. They have grown from small beginnings and present much the same appearance as an old house which has had additions made generation after generation in the distinctive style of each. The forge contains six heavy steam hammers; here are made all the heavy forgings for the steam machinery, etc., of the vessels under construction. The smithery contains 97 fires and several small steam hammers. Rolled work of every description, from sheet iron to armor plates, can be made in the yard.

The Thames Company, whose works are situated near the Mill Wall Company's, rank next, and indeed are second only in not being prepared to roll armor plates. The first great British iron-clad, the *Warrior*, was built here. Rolled plates are found to be superior, and though this company still build many large sized iron-clads, they procure the armor from other companies. The destinctive peculiarity of the Mill Wall and Thames Companies, over all others in Great Britain, and, indeed, in the whole world, is that they take rough iron scraps, chiefly with some puddled iron, in at the gate, and in a few months sail it out of their yard in the form of magnificent and well-appointed ships, ocean steamers and iron-clads. With the single exception of armor-plate rolling mentioned in connection with the Thames Company, every process connected with iron ship building is performed within the walls of their yards. Seven or eight heavy ships under construction, with the manufacture of every part belonging to them, progressing simultaneously, is not an unusual sight in each of these yards.

OTHER YARDS.

Next in order comes the establishment at Birkenhead, owned by Laird Brothers, where the *Alabama* and other rebel vessels were built under the protection of the British Government. The works cover about 19 acres, and are remarkable for containing two large permanent stone dry docks, for the construction of vessels, which are not often found in private establishments. These are 410 feet long, 85 feet wide, and of depth enough to take in the largest vessels afloat. From one of them the iron-clad frigate *Agincourt*, 380 feet long, and 6,621 tuns measurement, has lately been floated. It is the theory of this company that large vessels should be built on dry docks, as it saves much labor, and, besides, avoids the serious straining which they suffer in launching. Another feature of these works is an enormous pair of rolls 18 feet in length by 28 inches in diameter. Eight feet rolls are counted large in most iron mills. There is also a large planing machine where a slab of iron 33 feet long can be finished. The Lairds are accustomed to have five or six vessels on hand at once.

Messrs. Napier & Sons have an establishment on the Clyde, where they are now building three iron-clads for the Turkish Government.

Messrs. John Rogerson & Co. have a shipyard at Newcastle-upon-Tyne, and rolling mills at Consett, 13 miles distant. These mills are the most extensive in England, turning out bar and plate iron. In the shipyard eleven vessels have been seen under construction at once. At the

STEEL SHIP-BUILDING YARD.

of Messrs. Jones, Quiggin & Co., at Liverpool, ships built entirely of steel are constructed. Frames, plates, masts, yards, standing rigging, all being made of cast or rolled steel, or steel wire. This firm was the first to adopt steel in place of iron for ships, and their success may be seen from the fact that five steel paddle-wheel steamers may be frequently seen on their stocks at once. They also build vessels of iron or iron and wood.

We have not, in these few notices, given even a full list of the iron shipyards of Great Britian, but have merely glanced hurridly at a few, from which an idea of the magnitude and perfection of England's shipbuilding facilities may be gained, The yards on the Thames River turned out, in 1864, 117,000 tuns of iron vessels. Those on the Clyde are 33 in number, and launched, in 1863, 170 iron vessels, with an aggregate tunnage of 120,700 tuns. The production of other localities is as follows:—Mersey 80,000 tuns; Tyne, 51,236; Weir, 25,000 tuns; Tees, 15,000 tuns; which, with those vessels built at Belfast and Bristol, and other places, made an aggregate of 500,000 tuns of iron vessels built in Great Britain in 1864.

THE STEAM ENGINE MANUFACTORIES.

Chief of these is the great manufactory of John Penn & Sons, who stand at the head of their trade, as do the Mill Wall Company at the head of the iron shipbuilding. The works were begun by Mr. John Penn in the early part of this century, and in 1830 the manufacture of steam engines was commenced. The establishment was without especial reputation till 1840, when the use of the screw propeller was decided upon by the Admiralty for the British navy. Engine-makers were invited to send designs for a direct-acting engine, and Messrs. Penn & Son furnished the design of the engine now known as the "trunk engine," in which all parts are below the water line and capable of running at the high rate of speed required for propeller engines. It was approved, and a contract given for two engines for the *Arrogant* and *Encounter*.

These engines have now been supplied to no less than one hundred and thirty vessels in the royal navy, including seven of the largest British iron-clads. The navies of Italy and Spain are almost exclusively furnished with this class of engine. The design of Messrs. Penn & Son is said to be inferior in some points, but they have so often duplicated it, and have taken such pains with the workmanship, altering the troublesome parts when possible, that its effects may have been partially remedied. The works of this company are founderies and smithery at Greenwich, and a boiler manufacture at Deptford. The foundery is very old, and its appointments are antiquated. But such is the value of good superintendence and determined energy, that a competent witness testifies to the large castings made here, as possessing soundness, smoothness and perfectness superior to any that ever came under his notice. The machine shops are well appointed with modern conveniences, and the boiler-shop is acknowledged to be the most perfect of its kind in Great Britian, which, of course, means the world. Among its peculiarities are machines for planing the edges of boiler plates previous to riveting, which is an exception to the rule in boiler making. Other manufacturers of steam machinery of the largest class are: Messrs. Maudslay & Son, Messrs Humphrey & Tennant, and Messrs. G. Rennie & Son. The description we have given of Messrs. Penn & Son's establishment will suffice for all, as our design is principally to convey an idea of the magnitude of the British works for building and maintaining a navy. This brings us to the third division of our subject.

ARMOR PLATES

for the British Navy are produced at the works of the Mill Wall, Thames, Cyclops, Mersey, Park Head, and Park Gate Companies, all of whom compete for the government contracts. We will describe the works of J. Brown & Co., the largest manufacturers of armor plates in the kingdom; and first we will look at the process of manufacturing the massive slabs of iron which cover the sides of British iron-clads. The first plates ever made in England to protect a ship's sides from an enemy's shot were made during the Crimean war, by the Park Gate Company, at their works near Rotterham. They were four inches thick, but of snall dimensions to those now in common use, The first sea-going iron-clad built, was the *Warrior*, armed with hammered plates, 4½ inches thick. Hammered plates were soon discarded in favor of rolled; and, as the result of experience, the following process of manufacture has been decided upon:—

Bars of about twelve inches wide and one inch thick are first rolled; five of these are then piled on each other, and rolled into a rough slab; two of these slabs are rolled into a plate; four of these plates are rolled into another plate; and finally four of these plates are piled and rolled into a finished plate. The last plate thus contains 160 of the first plates. The iron is heated to a white heat for each rolling, the object of so many successive workings being to produce perfect homogeneity in the mass. In very thick plates the piling is carried still further. In ordinary five or six-inch plates, the thickness of one of the original inch plates is one thirty-second of an inch, or one twenty-seventh of an inch in the finished plate.

THE PROCESS OF ROLLING

is well worth seeing. The plates are heated in a reverberatory furnace, so called because the slabs of metal are placed in a chamber filled with flame, but in which they are not in contact with the coals. Twenty minutes, half an hour, or an hour, according to the size of the plates, suffices to raise them to a white heat. On looking through a little aperture in the furnace, as soon as the eye is accustomed to the intense glow of the iron and flame, the mass of metal may be seen, wearing a soft, waxy appearance, and looking too purely white to give a sense of heat. Drops of scoria or impurities may be seen running in vivid streams down the surface, and falling on the floor of the oven, which, being inclined, they run off inio the "throat" of the furnace, and are removed. Workmen draw the mass with heavy hooks, on to an iron carriage, and it is wheeled to the rollers and its end presented to them. The swiftly-revolving cylinders seize the glowing mass, and, with a tremendous hug, pull it between them. Troughs of water are hung over the rollers, and streams of liquid pour down on them. Clouds of steam rise as fire meets water, and make the work and workmen appear more Vulcan-like than ever. The process is repeated until the plate is the required thickness. Its edges are then trimmed according to pattern, in a planing machine, and, when it is placed in position on the side of the vessel, it fits its appointed place, as a glove fits the hand.

THE ROLLING MILLS

of England, capable of turning out armor plates, are six in number, and have been mentioned above. The works of Messrs. J. Brown & Co. are the largest, and their size may be estimated by the following condensation of the statistics of their works:—Area of the principal works, 18 acres; workmen employed, 3,024; quantity of coal consumed each week, 3,600 tuns. There are 60 puddling furnaces (furnaces for manufacturing scraps of old iron into bars), 42 steam-hammers, the drop of the largest being 8 feet with a weight of 20 tuns, and an anvil block weighing 161 tuns; the second size hammers are 12 tuns, and from this they descend to the smallest size. There are four sets of armor-plate rolls, two preparatory and two finishing. The ordinary size of armor plates is 15 feet long by 4 feet wide and 5 or 6 inches thick. But Messrs. Brown can roll larger plates than any other firm in the world. They lately made some for a Russian fortification 14 by 6 feet and 13½ inches thick, and others 7½ inches thick, 4 feet wide, and from 24 to 34 feet long.

The Mersey Steel and Iron Works, at Liverpool, are another very large firm. They work 11 steam hammers, from 15 tuns down. They possess an immense planing machine, having a traveling table 40 feet long, and two lathes of similar colossal proportions, being adapted to take in shafts 65 feet long. The works are also furnished with a steam traveling crane, with engine and boiler attached, which travels on rails laid down on the ground, picking up and transporting heavy work.

OTHER MACHINE AND TOOL MANUFACTORIES.

Besides these great establishments for the fabrication of ships and everything pertaining to them, the famous establishments of Sir William Armstrong, at Newcastle-upon-Tyne, and of Messrs. J. Whitworth & Co., at Manchester, are worthy of attention. The heads of these two establishments, Sir W. Armstrong and Mr. Whitworth, are well known to the world as

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men of high scientific attainment, and the works under their management present a perfection of plan and an elaboration of mechanical appliances not to be found in any other similar manufactories in the world. The foundery in the Elswick Works (Sir W. Armstrong's) is regarded as the most perfect in Europe. The cranes for lifting heavy work are operated solely by hydrostatic power, and a boy stationed at a lever controls their action perfectly. Another remarkable peculiarity is the large steam hammer, weighing 10 tuns, but which, by having the steam admitted over the piston, can give a blow of 65 tuns, the heaviest of any in use in Europe, except perhaps, at the great steel works of Herr Krupp, in Russia. Under this ponderous instrument the famous Armstrong guns are welded. Experiments were some time since made here with the object of heating iron by gas, which would prevent the deleterious action of sulphur, always contained in coal. The subject is an important one, but we don't know the result of the trials.

The establishment of Messrs. Whitworth is, par excellence, the tool factory of Europe. The machinery is of the best description, and contains many peculiar and very ingenious tools invented by Mr. Whitworth or his workmen. The guns of this celebrated mechanician now rival closely those of Sir William Armstrong, and a long series of trials have closed in almost a "dead heat."

THE FAIR OF THE AMERICAN INSTITUTE.

On revisiting the Fair, this week, we found many things worth looking at, some of which we shall give a brief notice of.

APPARATUS FOR THE RUSSIAN TELEGRAPH.

In the southwest corner of the building may be seen a sample of the instruments that are to be used by the Collins Russian telegraph line, 75 sets of which have been manufactured in this city. The instruments are fixed in a box, which is quickly converted into a table by screwing on the four legs at the corners. For transportation, two of the boxes are fastened together in one package; and when these reach the station the operator has merely to screw on the legs and connect the proper wires with the air and ground lines, when he is ready to receive and transmit messages. The manufacturers expect orders for an additional supply of these instruments, as some 200 or 300 will be required for the whole line.

BESSEMER STEEL.

Messrs. Winslow, Griswold & Holley, of Troy, N. Y., exhibit Bessemer steel in various forms—in rails, cross heads, connecting rods for marine engines, boiler plates with flanges turned to show the endurance of the metal, crank pins, bolts with knots tied in them; in fact, all conceivable shapes.

This steel is exceedingly fine grained in texture, and closely approaches the finest cast steel known to general machine work. A chipping chisel made from it was tried by us, and stood very well, although it is not recommended for tools. The flanged boiler plate has the advantage of being much lighter for the same strength of boiler, and also a greater facility for the transmission of heat, by reason of its thinness. Some of the specimens of flange turning were not only interesting as examples of the quality of the metal, but also for the good workmanship displayed. One three-sided aperture, about twelve inches long on each angle, had a flange turned around it as neatly and as square as if cast in a flask.

This steel will effect a great revolution in the proportions and weight of machines if properly applied. Among other curious examples of its toughness and tenacity a car axle bent double, cold, is shown.

GAYLORD'S COUPLING.

The American Coupling Co. exhibit a neat and useful coupling for hose or pipe, which can be connected or detached in a few seconds. It is perfectly air-tight, is used on steam or water, and is highly appreciated by those who use it. No. 33 Dey street, New York.

BEACH'S DRILL CHUCK.

This is one of those instruments which the introduction of twist drills has rendered indispensable. It is a highly-finished tool, is made of steel, and will take any-sized drill, from three-eighths to nothing at all; one of them will last a life time. It has three steel jaws in it, which move to and from the center by being forced against inclined planes by a screw in the end. By catching hold of the chuck as it revolves, the jaws can be screwed tightly so as to hold against any common work. An engraving of this chuck is all ready for publication in the SCIENTIFIC AMERICAN. All sizes, from five-eighths to three-sixteenths, made by Clark Brothers, West Meriden, Conn.

WEBSTER'S WRENCH.

This is a most convenient little instrument. It is an ordinary screw wrench, with a socket outside the lower jaw. A tool fits this square socket, and is fed up by screwing on the nut that ordinarily changes the size of the wrench. For cutting off gas pipe, holding a round bolt, or screwing up pipe, it is just the thing. The wide range this tool has gives it a great advantage over the ordinary pipe tongs. The wrenches are made purposely for the admission of the patentable portion. Webster & Co., No. 17 Dey street, New York.

MURDOCH'S STAVE SAWER.

This machine is on exhibition at the Fair, and saws two staves at once, by a saw arranged like a crown gear, except that the teeth are on the lower side. The saw runs horizontally, and seems capable of doing excellent work. The saw also acts as a plane, and leaves a neat finish on the stave.

ART ROOM.

The display of art works is not very extensive. There are a few paintings, but none of distinguished excellence.

The show of photographic pictures is meager, but the specimens furnished are for the most part good.

Rockwood & Co. present some very fine and large architectural and mechanical views. Their prints of locomotives are superb.

Williamson, of Brooklyn, shows some excellent life-size portraits.

Gurney & Son exhibit a variety of excellent portrait specimens, among which is a splendid group of military officers—Gen. Dix and others.

Gutenkunst, of Philadelphia, has a fine collection of card portraits of marked superiority, with specimens of porcelain pictures that are truly beautiful. A splendid picture of Gen. Grant graces this collection.

S. A. Holmes, of New York, exhibits a fine collection of large out-door views—public buildings, Niagara, Central Park, and a series of oil-region pictures. All the mysteries of boring, pumping and tanking petroleum are here to be seen in perfection.

Messrs. Anthony present a number of fine Worthleytype prints. This process has been lately patented in the United States. The paper is covered with collodion containing salts of uranium and silver, and then printed. We have before fully described the process.

ROTATING BELLS.

Mr. Harrison, of the American Bell Co., has a number of their composition bells, with his attachment for causing them to rotate as they are swung. The bell is hung loosely upon a round bolt, which is surrounded by a spur wheel made fast to the bell; this wheel communicates by a simple train of gears to a lever on one side, which is actuated by a cam as the bell swings, and which turns the gears by means of a pawl and ratchet wheel. The object of rotating the bell is to prevent it from being broken by the continuous pounding of the tongue in one place. Mr. Harrison says that this is the most common cause of the cracking of bells, and that giving them a very slow rotation prolongs their durability indefinitely.

THE AMERICAN BARREL MACHINE.

This company exhibit some barrels, made by their patent machinery, which are very handsome specimens of workmanship. The machines consist of an apparatus for compressing the stave so that it takes a permanent "set" in the shape desired, and also in another machine, whereby the staves are jointed and finished. The barrels are subsequently set up by hand. Flour barrels made by this process are very tight. We were informed that, of a mixed shipment of flour to Cuba, in hand and machine-made barrels, the former were subjected to six or eight cents reclamation for short weight, while the machine-made barrels lost nothing. Thomas Richardson, No. 68 Broadway, is the agent.

IMPROVED ELECTRO-MAGNET.

Samuel F. Day, of Ballston Spa, New York, exhibits an electro-magnet, which he claims to be an improvement over any at present in use. Mr. Day has made hundreds of experiments with various forms of electro-magnets, and he says these have led to the discovery that the nature and action of the residual magnetism remaining, after breaking the circuit, is modified by the proportions of the magnet; in long and slender spools the scope of its power extends much further from the pole than in short thick spools. As the armature must be adjusted beyond the reach of the residual magnetism, any arrangement by which the power of this is circumscribed, is of great service in operating a telegraph. Mr. Day, therefore, makes his spools very short and of large diameter, the exact proportions having been determined by his numerous experiments.

A CHEAP FRUIT CUP.

J. F. Whitney & Son, of Milton, Ulster Co., N. Y., exhibit a fruit box, which they sell at $20 per thousand—two cents apiece. It is made of a wooden splint, bent in a hoop and riveted, with a wooden bottom fastened by brads.

FOREIGN SUMMARY.

DR. PONOWSKI, of St. Petersburg, proposes powdered hellebore (*veratrum album*), as a remedy for the cholera; it is to be taken by the nose, like snuff. This is an infallible remedy when the patient sneezes eight or ten times after a pinch; but if the patient does not sneeze his case is altogether hopeless.

THE effluvia which escapes from sewers, in the very attempt to ventilate them, are of a very pernicious character, and have often been productive of mischievous effects. M. Robinet, a French chemist, has devised a very effective means of freeing the sewers from them. His plan has already been carried out on a small scale. He proposes that the furnaces of factories shall derive their supply of air from the sewers; the latter will thus be emptied of their mephitic gases, which will be destroyed by combustion, fresh air from the atmosphere supplying their place. He calculates that if the combustion of only 70,000 tuns of coal can be thus economized annually in Paris, or only one-tenth part of what is burned there, the sewers will be supplied with about 140,000,000 cubic feet of fresh air—that is, more than seven times their contents—daily.

IT is said that the impression produced on the officers of the British fleet during their late visit to Cherbourg, is that the iron shops at Portsmouth might be contained within the smallest basin in the Cherbourg docks, while the building, refitting and repairing works of the French iron marine occupy a space of many acres. It is evident that large establishments for iron ship building must, for the future, assume the most prominent position in British naval dockyards.

FROM Berlin we learn of the death of Astronomer Enke, whose name will ever attach to the comet he described and traced through its recurrent orbit; while other important additions to our knowledge of the firmament secure him immortality.

AT the mineral works of MM Perret, of Lyons, on emptying an old cistern which had for some time been filled with water charged with sulphates of copper and iron, moderately thick coverings of metallic copper were found attached to the wood which had served to support the roof of the cistern, and among the stones forming its floor. The debris of the wood had doubtless acted by reduction on the cuprous solution. The reducing gases developed in the cistern had also acted.

THE operation of fixing the 8-inch and 6 inch armor plates which will protect the reconnoitering tower on the upper deck of the *Bellerophon* has been commenced. The port and starboard portion of the tower will be protected by armor plates 8-inches in thickness, but as this portion will be of conical form, the chances of any hostile shot effecting any injury to it, although obviously more exposed than the other portions of the tower, are reduced to a minimum. All the 8-inch plates have stood the bending, slotting and planing processes to which they have been subjected without exhibiting any flaw. The 8-inch plates are the largest yet operated upon at Chatham dockyard; but arrangements are now being com-

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pleted for bending and working armor plates 8-inches in thickness, or double those of the thickness of the *Warrior*, with which the sides of the iron frigate *Hercules*, to be built at Chatham, are to be encased. Even this thickness of plating has been exceeded at the works of Messrs. John Brown & Co., Sheffield, where several thousand tuns of armor plates of no less than 13½ inches in thickness have lately been manufactured for the Russian Government for encasing the sea face of the forts at Cronstadt.

THE capital expended in Great Britain on railways to the present time has been upward of three hundred and eighty-five millions sterling, or nearly half the national debt. This amount has been devoted to the construction of eleven thousand five hundred miles of railway in the British Islands, which are now open for traffic.

THE Directors of the British National Steam Navigation Company pay £1 a week to a rat-catcher for professional services on board the company's steamers. The rats, being fond of good living, are in the habit of migrating from ship to ship when they come into port, and as good living is plentiful on board the company's steamers, the rats patronize them extensively.

GREAT curiosity has been excited at Cherbourg by a small vessel propelled by electricity with great speed. The inventor, a French engineer, has shown his discovery to M. de Chasseloup-Laubat, the Minister of Marine. Another of the favorite scientific questions there has for some time been submarine locomotion.

ANOTHER hot-air and steam engine has been invented by Huch & Windhauser, Germany. It is illustrated in the London *Engineer* of Sept. 8th.

NOTES ON NEW DISCOVERIES AND NEW APPLICATIONS OF SCIENCE.

THE MECHANICAL EQUIVALENT OF LIGHT.

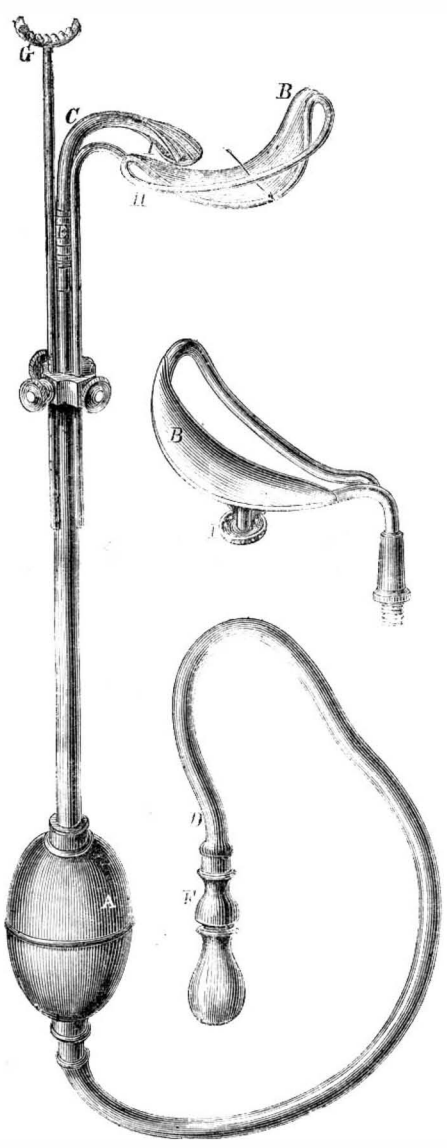
By a method, of which we shall give some account on another occasion, Professor Thomsen, of Copenhagen, has succeeded in ascertaining the mechanical equivalent of light. He finds that the mechanical equivalent of the luminous radiation, as distinct from the obscure radiation, from the flame of the French standard "bougie," is as nearly as possible 1·74 kilogrammeters per minute, being about one-fiftieth of the mechanical equivalent of the total radiation from the same flame. From this a writer in *Cosmos* has calculated the mechanical equivalent of the total light of the sun. He finds it to amount to something like that of 1,230 septillions of "bougies," or to thirty-five billions of tuns lifted a billion of kilometers per second—the lifting of thirty-five billions of tuns (French) a billion kilometers being about equal to lifting the weight of the earth twenty feet.

CHEAP METHOD OF OBTAINING CARBONIC ACID.

The Paris Societe d'Encouragement de l'Industrie has awarded its platinum medal to M. Ozonf, the celebrated manufacturer of seltzer water and soda water, for the simple and ingenious method by which he obtains pure carbonic acid gas with which to aerate those beverages. M. Ozonf burns coke in a furnace lined with refractory fire-clay, and supplies the furnace with sufficient air to effect complete combustion. The products of the combustion, consisting chiefly of carbonic acid gas and nitrogen, he first passes through water, in order to cool them, and, at the same time, to free them from mechanically admixed impurities, and then forces into the first of a row of receivers filled with solution of carbonate of soda. Except the last, which is open to the atmosphere, each of these receivers has a pipe passing from its upper part to the lower part of the next. The carbonate of soda in these receivers absorbs the carbonic acid contained in the gaseous mixture which is forced into them, becoming thereby converted into bicarbonate of soda, and the other elements of that mixture pass off from the last of the row of receivers into the air. When the solution of carbonate of soda with which the receivers were originally charged has become wholly converted into solution of bicorbonate, it is pumped into a boiler, in which it is heated by steam to 212° Fah., at which temperature the bicarbonate of soda gives off its second equivalent of carbonic acid, and is reconverted into ordinary or mono-carbonate. The carbonic acid so evolved is mixed with vapor of water, but is, otherwise, perfectly pure, and the aqueous vapor, in association with which it leaves the boiler, can be readily separated by condensation. M. Ozonf effects this condensation by carrying through a reservoir of cold water the pipes which convey the gas from the boiler to the gas-holder. The solution of carbonate of soda left in the boiler is used to recharge the receivers. As the portion of carbonate of soda first used will thus serve over and over again, *ad infinitum*, no carbonate of soda being actually consumed in the process, the cost of the carbonic acid obtained by this method is very little more than that of the coke which supplies the carbon for it—labor and wear and tear being quite insignificant items. While, therefore, both simple and highly effective, M. Ozonf's process is also very cheap.—*Mechanics' Magazine.*

DIBBLE'S DENTAL APPARATUS.

The process of filling teeth cannot, by any possibility, be mistaken for a blessing in disguise, never-



theless it has to be endured by most persons at one period or another of life. Anything tending to shorten the time of boring, scraping, filing and similar delights will be gladly welcomed by the community at large, and also by the professional operator.

The apparatus here shown is intended to control the tongue or keep it out of the dentist's way, also to remove the saliva from the mouth as fast as it enters, so that it will not interfere with the progress or durability of the filling, and support the upper jaw, so as to render the operation less fatiguing. To secure these objects the inventor—who is an operating dentist, and may be supposed to know what is wanted—provides a pump, A, and a metallic plate, B. The pump is merely a hollow vessel of india-rubber connected to a pipe, C. There is a valve at E, and also one at F; the end of the tube, D, is deposited in a basin. The jaw is supported by the crutch-shaped rod, G. The apparatus is used in this way: The mouth of the patient being opened, the india-rubber chamber, A, is held in the patient's hand, and the rod, G, moved up against the teeth in the upper jaw and secured at the proper hight. The tongue compresser, B, is then placed against that unruly member, so that it is held back out of the way; this action then brings the wire guard, H, against the cheek, so that it is pushed out also, and a fair opportunity given the dentist to proceed with all speed—the instruments being introduced between the guard and the tongue compresser, as shown by the arrows. The saliva that flows in the course of the operation is immediately removed from the reservoir, I, by compressing the india-rubber vessel or pump, A; this act draws it into the vessel through the pipe, C, from which it is expelled into the basin placed at the end of the tube, D.

The plate or tongue compresser, shown isolated, fulfills the same office as the upper one, but is more compact in form, the two details being here combined in one.

A patent is now pending on this instrument through the Scientific American Patent Agency by W. H. Dibble, D. S., of Bordentown, N. J.

How the "Glasgow" Caught Fire.

Our readers may remember that the British steamer *Glasgow* was burned in a mysterious way a few miles off this port. The fire originated among the cotton, and was caused in the following manner. We take the account from *Mitchell's London Shipping Journal*:—

"The sounding well led from the steerage, and it would seem that, in stowing the cotton, it had been placed over the aperture, so that the carpenter could not get near enough to try the water in the ship. The boatswain's mate went forward with him for the purpose of removing the cotton. The two men got upon the bales and crawled twenty feet along the top of them. The carpenter then explained to the boatswain's mate what was needful to be done, and the carpenter, having reached the hole, had to remove some dunnage. To enable him to do this the other man held the lantern, and, on rising, the carpenter accidently knocked it out of the mate's hand. As it was falling, the carpenter tried to catch it, but, unfortunately the door of the lantern flew open, the lamp fell out, and the flame from the wick came in contact with the loose cotton, which instantly burst out into a flame. The casualty was, therefore, the result of pure accident. After this fearful disaster we should think that, in future, the lanterns allowed to be taken in the hold, or among inflammable cargo, will be secured inside the former either by screwing down, or by a bolt. If the lamp had not fallen out of the lantern, the flames could not have come in contact with the cotton. We may, therefore, charge the destruction of the ship to two of the petty officers going among the cargo with a lantern having a loose lamp in it, which fell out on the door of the lantern flying open."

Sea-weed as an Insulator.

We understand that experiments have been made to test the value of sea-weed as utilized by M. Ghislin, of Hatton Garden, who gained the prize medal for manufactured articles made from this substance, and placed in the International Exhibition of 1862, and which it is now proposed to apply in the manufacture of the next Atlantic cable. Several specimens of a submarine cable made from this patented algæite have been tested by eminent scientific men, who have reported most favorably as to its merits. The advantages are said to be that it is a perfect non-conductor of electricity; it readily combines and amalgamates with rubber, gutta-percha and other gums; it will resist the influence of salt water when other supposed non-conductors have lost their insulating powers, and that while the ocean destroys nearly everything submerged in it, sea-weed, being its natural offspring, is preserved by restoration to its native element.—*Mechanics' Magazine.*

A MAN in New Bedford has very nearly discovered a perpetual motion. Nothing seems wanting to complete success but the removal of a "hitch" that appears to prevent the machine from starting on its endless journey. We are not informed of the nature of the hitch, but we presume it cannot be of a very serious character, and, like the shareholders in the Atlantic cable, the inventor is sanguine that he will "fetch" it the next time.

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Platinum Glass Pots.

MESSRS. EDITORS:—In your journal of this date there is an article on "Platinum Crucibles," by F. H. S., in which he says:—"If platinum crucibles can be made to stand heat and fluxes, at a reasonable price, and will last, on a guaranty, say four months, a large business can be done," etc.

Some twenty-five years ago I made some experiments with platinum, in hopes of making it available in the flint glass business (though not for crucibles or pots, as they are technically named); and I am therefore able to assure F. H. S. that it will stand the heat and fluxes with impunity, without diminution in size or weight, and would, if carefully used in dragading and scraping, last for years; but the first cost will be an insuperable barrier to the practical use of that metal for the purpose designated, for, at a rough calculation, the cost of platinum pots for a ten-pot flint furnace would not be less than $500,000.

My experience teaches me that F. H. S. is unjust to manufacturers in insinuating that they "take so little interest in the scientific part of their art." I do not think there is any business that requires and receives a greater share of attention, or in which more money is expended in practical experiments, than in the flint glass business. He is, however, correct in his supposition "that they desire to keep the formulas secret," and, I opine, that if F. H. S. had devoted his time for years, and expended no inconsiderable amount of money, in chemical and practical experiments to improve the quality of his metal, that on his succeeding in doing so he would not be so apt to "contend there is no necessity for secresy."

The experiments of M. Pelouze have, doubtless, been on a diminutive scale, probably in a small experimental furnace. I always built my furnaces with proper facilities for this purpose.

I imagine your correspondent is not acquainted with any other branch of the business than the hollow-ware trade, while there are five different and distinct branches, viz.: flint glass or crystal, plate glass, crown glass, broad or common window glass, and bottle or hollow-ware, requiring different styles of furnaces and shapes of pots, and an equally distinct class of workmen. The flint glass being the most beautiful and costly, and requiring the greatest amount of practical and scientific knowledge in the manufacture, and a great delicacy of manipulation on the part of the workmen to produce a perfect article.

In regard to the construction of furnaces, etc., the relative proportion of pots (crucibles) and furnaces must necessarily be somewhat varied, depending entirely on the nature of the fuel and the power of evolving caloric. I have myself used five different kinds of fuel, and have found it necessary to vary the size of the eye and the rise or spring of the cap or crown to suit the fuel. As to the best material for benches (as they are termed in the hollow-ware houses) or sieges (in the flint house), I cannot think there can be two opinions among men conversant with both branches of the business. I have known a clay seige, constructed with care, last fourteen years, while the same material, used for the benches of a hollow-ware furnace, would not, without entailing trouble and expense in repairs, last a single blast of ten months; this will be obvious to the initiated. But it would take up too much of your valuable space to even cursorily enter into details at a greater length upon the various points mentioned by your correspondent; they could be better treated of, be of more use to inquirers, and certainly more interesting and entertaining to your readers, if systematically arranged in the form of a series of articles on glass making. W. H.

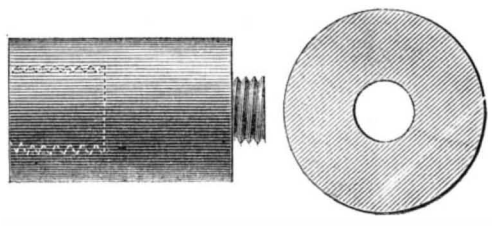
Bordentown, N. J., Sept. 9, 1865.

Chuck to Hold Sheet Metal, Etc.

MESSRS. EDITORS:—To turn a thin piece of sheet brass circular, and then to mill its edge, requires time and skill; first, to fasten the uneven piece of brass plate to a wooden chuck by means of screws, in order to turn a circular disk; and, secondly, to fasten that disk between points, and a center, to hold it true and firm during the time needed to mill its edge. Unless great care be taken, the sheet bars will be indented by the points and the center-point. To obviate these difficulties, I adopt a very simple and quick mode of fastening the metal plate to a chuck.

Some of your readers may suggest that the plate could be secured by shellac or cement. This plan is the true principle, but the slightest blow would detach the plate and spoil the work. If, however, you use solder as a cement, the adhesion is perfect; and by the following plan, in a few minutes, the plate can be fixed so firmly to the chuck that no blow or jar will affect it.

As I have found old hands at the lathe entirely ignorant of the process of soft soldering, and as I have labored for years under the same disadvantage, it may interest some of your young subscribers to know how to attach two pieces of metal in a few seconds. This is effected by placing on each piece, with a leather or small brush, a small quantity of muriate of zinc, and then holding each piece over a spirit lamp—taking care not to inhale the former—and when it boils rub the plate with a thin stick of pure tin or soldier; I prefer tin, which I melt in a ladle, throw out, with a jerk, on a metal or stone slab, so as to form a sheet when cold, and then cut into strips a little larger than an ordinary match; I, however, prefer drawing the tin into wire, of different thicknesses, and using it in that state. Any one can make the muriate of zinc by filling an ale glass one-third full with muriatic acid, and adding pieces of zinc (in the open air) until it will dissolve no more, then pour it off clear. As an experiment for the learner, let him heat a cent by a spirit lamp, placing a drop of muriate of zinc on it, and then rubbing a small quantity of tin on it, while the cent is held by a pair of pincers; then take a copper tack, dip the head in muriate of zinc, and place the head on the middle of the cent, which is still held by the pincers over the lamp; in an instant the head of the tack will become turned, and when both are cool press it with the foot into the floor. The first person who sees the cent on the floor will try to pick it up, and he will enjoy a laugh at the other's expense, and, at the same time, have taken the first lesson in soldering.



But to return to my chuck, which I call my "solder chuck." It would answer to heat any thin brass chuck and tin its face, then to heat the sheet brass you wish to turn round, and to tin it also; placing the two tinned surfaces together, you heat them and let them get cool, with a weight pressing them together until cold; but this would consume too much time and alcohol. I, therefore, make my chucks, of brass or iron, with a steel male screw, projecting not quite one-fourth of an inch beyond the face of the chucks.

I make several washers of brass, one-fourth inch thick, and tap them so that they screw acccurately on to the male screw; they are of different diameters, to support smaller or larger pieces of brass plate, according to the diameter of sizes I may wish to turn. One side of these washers I tin by the process before described. I now take a piece of sheet brass (square or any other shape) mark the center with a point; then I tin, as before described, a place about as large as the washer to be used; then I place the tinned side of the washer on the sheet brass, in the center, which you see through the hole in the washer; let the whole be heated over a spirit lamp, and cooled, and this operation—which will only take a minute or two—fastens the sheet brass to the washer perfectly, and you now can screw the washer on to the chuck. You can thus turn the sheet brass round with perfect accuracy, and mill its edge, if you choose, as our silver coin was formerly milled on the edge, and then if you wish to form the bottom or top of a metal box you can turn a groove to receive the body of the box.. To disconnect the finished disk from the washer you heat it over the lamp and separate the two while hot, rub off most of the tin with a piece of newspaper, and, when cold, the rest of it with sand paper. I have before me a flat, round, brass match box, made in this way; grooves were turned in the top and bottom disks, and short pieces of brass pipe were soldered into the grooves in the same way as above described; the bottom was turned with eccentric circles to strike the match on, and the top ornamented with looped figures by an elliptical cutter; the box was then bronzed—it might have been plated or gilted.

The above description illustrates only one kind of "solder chuck" for turners. It will suggest, however, a variety of other plans for attaching work to be turned by the adhesive properties of solder. For instance, when I wish to turn steel "in the air" with great accuracy, I bore a hole into a brass chuck to receive one end of a bar of steel, which I solder into it, and thus avoid the possibility of shaking so usual in universal or die chucks.

E. J. W.

Lenox, Mass.

Cement for Aquaria.

MESSRS. EDITORS:—I would be obliged, and, no doubt, others of your readers, if you would give us the proper quantities of glue, rosin, oil and whiting required for a good composition to ornament frames or other inside decoration. I find by putting them in by chance they are apt to crack up and cost much labor to refix.

I have seen for years many inquiries in your paper for a good cement for aquariums. I have tried fifty different ones, and find the best composition is, one part common pitch, one-half part gutta-percha; they can be melted in a little turpentine. To make it work easier, there must be no coal oil in the turpentine, or the pitch will soften and be destroyed; a rascally druggist made me lose several dollars' worth of gutta-percha in that way. You will find this mixture gives a little with the material that the tank is made of, as the changes of heat and cold affect it; and it will adhere to glass, wood or iron. E. BRUCE.

St. Louis, Mo., July 30, 1865.

[The proportions are one pound glue, one-half pound linseed oil, two pounds whiting. Stir well while melting, and let it cool gradually on a stone covered with powdered whiting; heat it well again until it is tough and firm; cover with a damp cloth when not in use.—EDS.

Perfumers.

MESSRS. EDITORS:—Most all of your readers have seen the neat little article used to blow permme in a handkerchief; it is composed of two pieces of tube glass, and when one is inserted in a bottle, and the other piece is blown through, the perfume rises in the tube, and is blown off in a delightful spray. What I wish is, that you will explain the philosophy of the thing. Why does the fluid rise in the main tube? Is it caused by the current of air passing at right angles with the main tube? Or how, then? C.

[The explanation is simply friction. When a current is moving through any fluid the particles on the outside of the current rub against those of the fluid, and carry along a portion of them, thus creating in the fluid a current in the same direction. When the vertical limb of a T-shaped tube is inserted in a liquid, and a current of air is blown through the horizontal limb, the air is swept out of the vertical limb by this rubbing or dragging action, and the liquid is then pressed upward into the tube by the weight of the atmosphere resting upon the surface outside of the tube.—EDS.

Petroleum for Worms.

MESSRS. EDITORS:—I read your abstract of the debates of the Farmers' Club with much interest, but have not yet seen it stated that coal oil, such as is used for lamps, will destroy tree worms, and the common yellow caterpillar and the measure worm. With us these vermin appear some three weeks earlier than with you, and may then still be dosed.

I have a plum tree some dozen years old—a bearing tree—in my yard, that has been regularly attacked and the verdure destroyed, unless much time was spent upon it, every summer. This summer, remem-

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bering how effectually my people extirpate vermin from the house, I took my fishing rod, with a rag of the bulk of an egg tied upon the tip, and attacked them. I saturated the rag two or three times, and used it as many, touching under and upon the nests wherever I could, and not very thoroughly either. The leaves that had been attacked by the worms died and dried up; this was evidence of cessation of their work. In a week new leaves appeared under the still standing web, but there were no more signs of worms. A second crop, being another batch, appeared in a month or six weeks, and were as easily disposed of, and none have since appeared. I believe this to be a thorough and good remedy. Those worms that it touches I know it kills, and such as get a smell of it leave at once, perhaps die.

R. H. A.

Baltimore, Sept. 9, 1865.

An Electric Circuit.

Messrs. Editors:—In a late number of the Scientific American there appears an article stating the manner in which the defect in the Atlantic cable was located. From the language used it appeared that the current sent out on the wire from Valentia passed off at the bit of wire, and the ocean then served as a conductor to carry the current back to the coast of Ireland—forming what electricians term a "circuit." Do I understand that, to form a circuit, the current must return to the same point from which it started? and, if so, why would not the current that passed off the wire at the place the bit of wire ran through the outside covering of the cable, as likely cut across through the ocean to the American coast as to return to the coast of Ireland? Or, in other words, explain the word "circuit" as employed by electricians.

Subscriber.

Paterson, N. J., Sept. 13, 1865.

[If you pour some dilute sulphuric acid into a glass cup, and place a plate of copper in the cup on one side, and a plate of zinc on the other, so long as the metal plates are not brought in contact or connection no action takes place; but if a metal wire or other conductor of electricity is stretched from the copper to the zinc outside of the liquid, a current of electricity immediately starts from the zinc, passes through the liquid to the copper, and from the copper along the wire to the zinc, thus flowing in a perpetual circuit. Instead of leading the wire directly from the zinc to the copper, it may be led from the zinc into the earth, and from the copper into the earth, when the current will flow the same as through a direct connection. The reason why the current should go to Valentia was, that the cable was connected with one plate of the battery, and the other plate was connected with the ground at Valentia. The mode of connecting the wire with the ground is by soldering it to a broad copper plate, and burying the plate in moist earth. In cities an easier and more effectual method is to connect the wire with gas or water pipes. At some of the stations on the line of the California telegraph, in the Great American Desert, the ground is so dry that it acts as an insulator, and no conducting connection with the earth can be made. It was at first supposed that the ground acted precisely the same as the portion of wire which it displaced, and that the current of electricity darted along through water, gravel and rocks from the end of the wire connected with the copper plate to the end of that connected with the zinc plate; but it is now regarded as settled that the earth is a great reservoir of electricity, into which the current flows from the end of the one wire and from which it is drawn into the end of the other.—Eds.

Action and Reaction.

Messrs. Editors:—There is, I believe, an important law of mechanics, never, as yet, definitely announced, and, so far as I am aware, lying unknown, because a current form of words, true in their application to a different case, is supposed to cover vastly more than their author ever intended. In this I allude to action and reaction in a mechanical sense, as distinct from the same when considered as an element of statics. Since Newton announced as a law of statics that action and reaction were equal and in opposite directions, the law has, with unquestioning credulity, been extended to another science as different from that of which this simple law forms the chief part as two sciences in the least akin can ever be. Statics, as is well understood, treats of pressures alone, or of the intensity of forces, which is the same thing, while the science of mechanics considers forces with reference to their quantities. The law of statics referred to can, therefore, only mean that from every exertion of power the pressures produced in opposite directions are equal. But when we come to speak of mechanical action and reaction the question is what is the *quantity* of force consumed respectively by action and reaction. A mechanical force being always estimated by multiplying its intensity into the distance through which it moves, and, the intensity being always equal in opposite directions, it follows that the quantities of force expended in each of the two ways are to each other exactly as the distances acted through in the different directions; or, in other words, as the respective lengths of the forces. Assuming this as probably clear to every one, we have now but to inquire for the law which governs the distances moved through by different bodies in the same time when acted on by equal pressures. But it is a matter of every-day observation that this is proportionate to the intensity of resistance which they offer. The deduction from this is so clear that it might be made by any one, viz—that, in a mechanical sense, action and reaction are in opposite directions, and in quantity inversely as the intensity of the resistance in their respective directions. And this is a law verified by so large a number of instances that none can have failed to observe them, rendering a present induction of facts unnecessary.

Isaac E. Craig.

Cleveland, Ohio, Sept. 16, 1865.

[Prof. Treadwell has published a pamphlet discussing this problem at length and coming to the same conclusion as our correspondent.—Eds.

To Preserve the Eyesight.

Messrs. Editors:—It may be well known, perhaps, by many of your readers, if not all, that, as a person grows old, the eye loses its convexity or the pupil becomes flattened. For this reason near-sighted people, whose eyes are too convex, often experience an improvement in their eyesight as they grow old, for the reason mentioned above. If all persons who are not near-sighted should, every time they wash their faces, press their eyes outward, or try to make them as round as they can, taking care not to press or flatten the pupil of the eye, their eyesight would be improved. In this manner I have improved my eyesight, which showed signs of decay. Another theory, almost as important—avoid rubbing the eye when it itches, for in this way the eye is not only inflamed but often flattened. When the eye feels tired wet your finger with spittle and rub it around the lids, this will cure inflammation; and, next, avoid coming from the dark to light, or light to dark; and never read much in a cloudy day or look long sideways.

C.

[Many years ago we heard this same direction for preserving the eyesight, and, being then very young, we accepted it without questioning; but every year of our observation of men brings some new evidence to strengthen our distrust of human testimony—not from the disposition of people to tell falsehoods, but from their carelessness of observation. When the French tourist saw a Dutchman recover from a fever after eating boiled cabbage, he entered in his journal: "Boiled cabbage will cure fever;" when, however, he saw the same remedy followed by death in the case of one of his own countrymen, he modified his conclusion, and made a new entry in his journal: "Boiled cabbage will cure a Dutchman of a fever and kill a Frenchman."

Men recover from disease without using any remedy; they doubtless frequently recover in spite of injurious remedies employed. Many persons never have occasion to use spectacles, though they follow no special method in washing or rubbing their eyes. We know of no reason why the plan proposed by our correspondent should not be perfectly effectual; we only want satisfactory evidence to believe that it is so; but one or two cases, observed in the careless manner which is common with most people, and not compared with the numbers of cases in which the plan was not pursued, we should hardly regard as any evidence whatever.—Eds.

UP IN A BALLOON.

At the junction of Sixth avenue and Fifty-ninth street, in this city—just by the southern boundary of the Central Park—there is a vacant lot, which has been rented by the well-known aeronaut, T. F. C. Lowe, for the purpose of giving any person who may desire it, a balloon ascent to the hight of a thousand feet. The lot is inclosed by a board fence, and twenty-five cents is charged for admission, the sum of five dollars being charged for each ascent; the balloon carrying up two at a time, beside the aeronaut, who accompanies them—thus making the charge two and a half dollars for each person. The balloon is held by a rope an inch in diameter and 1,200 feet in length, which is passed under a pulley and wound around a large drum, 16 feet in diameter. During the ascent the revolutions of the drum are held in check by two men with levers acting as brakes. The balloon is drawn down after an ascent, by turning the drum—a horse being at present employed for this service, though it is designed to use a steam engine. As a measure of precaution, a second rope is attached to the balloon, and this is let out and drawn in by hand. The balloon is about 40 feet in diameter, and holds about 25,000 cubic feet of gas. Its buoyant power is estimated at about 1,500 pounds, though it is the practice to take up only two persons at a time beside the aeronaut.

In the still bright forenoon of September 20th, two of "us" took our seats in the basket, some bags of sand were lifted out, the stout rope that fastened the balloon to the earth was unhooked, the word "All right!" was given, and we were lifted easily and swiftly upward into the air. In accounts of balloon ascensions it is usually stated that the sensation is that the balloon remains stationary while the earth sinks away beneath it; but this is not the case in this kind of attached ascent. The earth seems to stand as firm as ever, while we are the movable things that feel ourselves borne gently upward to a hight in the air, compared with which the climbing of Trinity church spire, or Bunker Hill Monument, is contemptible. Though both extremely sensitive in this respect, no giddiness was experienced—the stout rope netting around the basket making a tumble-out manifestly impossible. We were, therefore, able to enjoy the novel experience with unalloyed satisfaction and pleasure.

There is, perhaps, no spot on the earth better fitted for such ascents than the one selected by Mr. Lowe. On one hand is the Central Park, with its serpentine roads, green lawns, and bright lakes and reservoirs; and on the other, the great city, with its long parallel avenues and cross streets, with its cars and omnibuses looking like crawling turtles, and its Liliputian men and horses moving about so far beneath us. The geography of the city and its environs is displayed with remarkable distinctness; the North and East rivers, the islands of the harbor, the towns and villages all about, with embracing woods beyond—are shown in the double clearness of a combined map and landscape view. After gazing our fill upon the scene from our airy hight, we inform our attendant aeronaut that we are ready to descend, he blows a shrill whistle, the horse commences his circling journeys around the whim, and we are drawn quite rapidly down to the surface of the earth again. The descent occupies about five minutes; the ascent a little less.

The whole thing is admirably managed, and nothing could be more agreeable and satisfactory in every respect. Mr. Lowe informs us that more ladies than gentlemen have improved this extraordinary opportunity to make a short aerial journey.

Submarine Cables.

In Europe, Asia, Africa, and Australia there are 52 submarine cables, which are of the aggregate length of 5,625 miles, and the insulated wires of which measure 9,783 miles. The longest of these is 1,550 fathoms, and the shortest 1½ fathom. There are 95 submarine cables in the United States and British North America, which measure 68 miles, and their insulate wires 133 miles. The overland telegraph line between New York and the west coast of Ireland, through British Columbia, Northern Asia, and Russia, will be 20,479 miles long, 12,740 miles of which are complete. It has at length been resolved that this line shall cross from America to Asia at the sothern point of Norton

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Sound, on the American side, to St. Lawrence Island, and from thence to Cape Thadeus, on the Asiatic continent. Two submarine cables will be required for this, one 135 miles long, and the other 250 miles long. Cape Thadeus is 1,700 miles from the mouth of the Amoor River.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Device for Sifting Flour and Other Substances.—This invention relates to a new and improved device for sifting flour and other substances for domestic use. The invention consists in the employment or use of a semi-spherical sieve, in connection with an oscillating frame provided with spheres or balls, all being arranged in such a manner as to insure the flour being sieved in a thorough manner, with the least possible labor, and without pulverizing, and forcing through foreign substances, as is frequently the case with other devices of this kind. It is a very economical and ornamental affair, and will, doubtless, be extensively used. James Myers, New York City, is the inventor.

Loom.—The object of this invention is a hand loom, in which both the motion of the harness and the shuttle motion depend upon the motion of the lay or batten. The harness motion is effected by an arm extending from the batten and connected by a pivot with a lever catch that acts upon a lantern-shaped cam, mounted on the treadle shaft, in combination with suitable arms or tappets inserted in said treadle shaft, in such a manner that for each stroke of the batten a quarter revolution, more or less, is imparted to the treadle shaft, and the harness is changed by the action of the tappets on the treadles. The shuttle motion is effected by means of sliding blocks secured in each end of the batten, and operated each by a spring lever or driver, which is set automatically by the combined action of square disks, hook catches and cams, in such a manner that on each forward stroke of the batten a partial revolution is imparted to each of the square disks, and the driver on one end of the batten is set while that on the other end (having been set on the previous stroke) is liberated, and, by its action on the sliding block, connected to it, the shuttle is propelled to the opposite end of the batten. John Seaman and Wm. G. Henderson, Andover, N. Y., are the inventors.

Decarbonizing Retorts.—This invention consists in the employment of a current of air, either mixed with steam or without the same, for the purpose of decarbonizing retorts, particularly clay retorts, such as generally used for manufacturing illuminating gas, and for other purposes. Such retorts are liable to absorb a quantity of carbon, and a large quantity of carbon or soot adheres to their inner surface, particularly toward the back. If this soot or carbon is not removed, the retort becomes useless after a short time. Patented in the United States and Europe, through the Scientific American Patent Agency, by G. W. Edge, Jersey City, N. J.

Machine for Drilling Rocks, Etc.—This invention consists in the employment or use of a spiral lifter, in combination with a tappet extending from a sleeve fitted in the drill or drill rod, and with an arm extending from said sleeve in the cam slot, in such a manner that, by the action of the cam slot and arm, the tappet is held in contact with the thread of the feeder until it arrives at the end of the stroke, when the same, by a curve in the cam slot, is thrown out of contact with the feed screw, and the drill is allowed to drop, and, while being thrown out of gear with the feed screw, it is turned, causing it to strike a different spot on each stroke. By this arrangement two or more drills can be operated by means of the same lifter and by the same driving power. Robert Hood, Dayton Ohio, is the inventor.

Balanced Slide Valve.—This invention consists in a balanced slide valve for steam engines. The valve is placed in a cylindrical steam chest, which has two steam pipes, one near either end, each encircling about two-thirds of the steam chest, said pipes being in communication with the steam ports which lead into the opposite ends of the cylinder. Steam is admitted into the chest at one end, and, the valve or piston being hollow, it is allowed to pass through it into the other end, thereby providing for an equilibrium of pressure on both ends of the valve. C. W. Tremain, Memphis, Tenn , is the inventor.

Umbrella and Parasol.—The object of this invention is to connect the stick of an umbrella or parasol to the ribs and their co-operative parts in such a way that the said parts shall be free to rotate on the stick instead of being fixed thereto, so that when the umbrella is extended and in use the part composing the cover will yield when it meets an opposing object, and will take a rotary motion on the stick, thereby relieving the hand and also the umbrella from strain. Wm. Damerel, Brooklyn, N. Y., is the inventor.

Gaiter Boot and Shoe.—This invention relates to a new and useful improvement in the lacing up arrangement of a gaiter boot or shoe, whereby the same is rendered water-proof from the bottom to the top; or, in other words, no seam or joint is allowed at the lacing for water to pass through, and the gaiter or shoe at the same time rendered capable of being applied to, and taken from, the foot, as readily as those of ordinary construction. Thomas Powell, Richland, Ind., is the inventor.

Machine for Dressing Minerals.—This invention relates more particularly to a machine especially adapted to the dressing of kaolin clay, so extensively used in the manufacture of porcelain ware, and also paper, and it principally consists in submitting the clay to the action of a current or currents of water within a series of one or more drags provided with flood gates, arranged so as to be opened and closed at pleasure, whereby the passage of the water with the clay through the drags can be regulated as may be necessary, and thus the separation or removal of all gritty substances from the clay accomplished—the pure kaolin being deposited by the water current in any suitable receiver or tank, from which it can be removed in any proper manner. By this machine the dressing of the clay is accomplished in a most satisfactory and expeditious manner, and, by duplicating some of the parts of the machine, a continuous operation can be maintained —an advantage of much importance. Thomas Moore is the inventor, and has assigned his right to John Ellerby, of No. 63 Pearl street, New York City.

Chair for Barbers, Dentists, Etc.—This invention consists in a novel construction of chair for the use of barbers and dentists; it comprises a stool and mirror, and the body of the chair is provided with receptacles for a supply of hot and cold water, implements of trade, washing apparatus, money drawer and other closets. The legs of the chair body are hinged so that they can be folded up, and the sides of the stool can be separated from each other and folded up, so that the whole apparatus can be packed in a small compass for transportation. Henry Remick, Portsmouth, N. H., is the inventor.

Alarm Lock.—This invention relates to an alarm attachment for locks, and also to a key-hole guard for the same, whereby it is believed that a very simple and efficient means is provided against burglary, and also for giving an alarm whenever the slide latch of the lock is operated and a person opens the door. Jacob Euteneur, of Peoria, Ill., is the inventor.

Wind Wheel.—This invention relates to an improved device for obtaining power from the wind, and it consists in the use of a wind wheel provided with a vane and shield, and with oblique fans or buckets, and arranged with a gate in such a manner that the speed of the wheel may be regulated as desired, and the wind made to act efficiently upon it. The invention also consists in a novel means for operating the gate and for stopping the wind wheel when required. John A. Hubbard, of West Houlton, Maine, is the inventor.

THE NAVAL ENGINES.

Since the article on page 216 was written we have obtained some additional particulars. Without giving a detailed statement of the log of the two vessels, which we have not room to publish at this late hour, suffice it to say that the *Algonquin*, at 8 o'clock on Sunday evening, had made 44,741 revolutions, burning 1,600 pounds of coal per hour, and carrying 70 pounds of steam, while the *Winooski* had made 44,718 revolutions on an average of 17 pounds of steam. The friends of the *Algonquin* are very confident of success. The naval engineers complain that the draft is very poor, and that it is hard to make steam. At 10 A.M., the 25th inst , the *Algonquin* was lying idle at the dock, while her opponent, the *Winooski*, was paddling away vigorously. The *Algonquin* stopped in consequence of a bursted feed pipe, and will resume as soon as her repairs are completed. It is impossible to avoid noticing the fact that the *Algonquin*—Mr. Dickerson's boat—has broken down several times in the course of the trial; as also, that the engine, when in operation, performed poorly in comparison with the vessel opposite. On two occasions the engine stopped, when hooked on, without the slightest warning, when the boilers had 70 lbs. of steam on and heavy fires in; the tubes have collapsed, and several minor casualties of less note have occurred. The *Winooski's* engines work beautifully, and between the times of the exhaust the clock can be heard ticking in the engine room. At the time when the *Alyonquin* ceased to work, the *Winooski*, as reported by the naval engineers, was 330 revolutions ahead of her.

A Locomotive Using Petroleum.

Mr. P. Hayes, of the Victorian Chemical Works, Footscray, Australia, has made another successful trial of his new invention for generating steam, from Williamstown to Melbourne. It was intended to have made a final test of his novel scheme by running a train a considerable distance on the Victorian line, for the purpose of ascertaining its carrying powers with loaded wagons, but his plans were thwarted by some unforeseen mismanagement on the part of the authorities. Mr. Hayes's discovery is the result of two years' close study, and is a new means of raising steam by oil in lieu of coal, which, if carried to a successful issue, will be attended with great economical and other advantages. The nature of the new process is to convey a hydro-carbon oil through heated retorts, to enable the gas to come in contact with hydrogen. This produces a large volume of smokeless flame, extremely pure and brilliant. It is unattended by anything of an explosive nature, and the heat therefrom is sufficient to produce steam as fast as coal or coke in an ordinary furnace. The only alteration made in the locomotive is the fixture, in that part of the tender in which the coal is usually deposited, of an iron cistern or tank, constructed to contain about 250 gallons of hydro-carbon oil. In order to permit of oscillation between the engine and tender, a small pipe, with a strong leathern joint, is carried from the tank to the bottom of the fire-box, where three small retorts are fastened in place of the ordinary bars. The oil runs into these, heat is applied underneath, and directly the gas begins to form, hydrogen is thrown in, by very simple means, and the contact creates the flame above alluded to, which, on passing through the tubes of the boiler, generates steam with surprising rapidity; and, instead of occupying two hours, as is customary by the old system, Mr. Hayes can, by his new process, get up steam in a locomotive with cold water, high pressure of 110 pounds, in the short space of three-quarters of an hour. The engine, as on previous occasions, was brought from Williamstown to Melbourne by Mr. Haughton, foreman engineer of the Government workshops at Williamstown, steam being on this occasion at 110 pounds. The gentleman speaks in very high terms of the new principle, and his opinion is supported by many of the railway officials. Mr. Hayes declares that his patent is applicable to any ordinary steam-engine boiler. Presuming the affair to turn out a success, the saving to the locomotive in many respects would be great, seeing that the oil is inexpensive, and can be obtained in large quantities; and, as applied to marine engines, the invention is most valuable from economy of space. Another great advantage is, that the money which at the present time has to be transmitted to New South Wales for coals would be kept in Victoria, the ingredients with which steam is produced being derived from a mineral product which is found in inexhaustible quantities in this colony.—*Melbourne Age.*

[Instead of "hydrogen," it is probably either oxygen, or atmospheric air, that is thrown in to burn the vapor of petroleum. There is no difficulty in making steam with petroleum; the only objection is the expense. If, in Melbourne, a pound of petroleum does not cost more than a pound and a half of coal, it may be an economical fuel.—Eds. Sci. Am.

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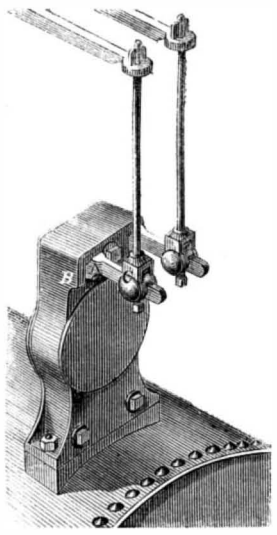
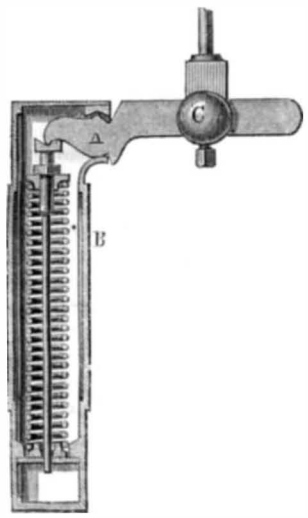
CAMERER'S SAFETY-VALVE BALANCE.

This simple and durably-constructed balance, illustrated in Figs. 1 and 2, was originally intended for locomotive engines, but can also, with great advantage, be used on marine engines, or any place where a dead weight is objectionable.

It is well known that a dead weight on a safety-valve lever is the most desirable and safest, wherever it can be applied; but on locomotive boilers, which rest on springs, it cannot be used, as its action on the valve would be influenced by the vibrations continually occurring. On marine boilers, where weights are still in use, the rolling of the ship occasionally makes it necessary to lash the levers down until the weather moderates, thereby destroying the only virtue of the valve. Spring balances, as generally made,



are more or less objectionable, on account of the springs becoming stiffer as the valve rises. Various plans have been adopted to overcome the defect by regulating the strength of the springs, thereby depending on the vigilance of the engineer to prevent the pressure from getting too great; whereas, the balance here illustrated, requires no attention whatever when in use, as an increase over the allotted pressure cannot take place.



The arms, A A, can rise as much as the safety valves may require, without additional pressure, which makes this balance equal in efficiency to a dead weight. An example will make the disadvantages of spring balances now in use more apparent. For instance, if a safety-valve lever is held down by a spring, the other end of which is fastened to the boiler or some other fixed point, the lever cannot rise without increase of power over and above the pressure it was calculated for; and if the proportions for length of lever are as 1 to 10, then the valve cannot be lifted one-eighth of an inch without raising the end of the lever ten times one-eighth, or 1¼ inches—which distance is, on the ordinary spring balance, equal to 28 lbs.; and ten times 28, or 280 lbs., on the valve. Now, if we have a valve of 2½ inches diameter, or 4·9 square inches area, the additional pressure would be 57 lbs. per square inch to lift said valve only one-eighth of an inch off its seat. Under such circumstances it ceases to be reliable, and requires watching and regulating to avoid over-pressure or accident.

The advantages of this improved balance are in the peculiar lever arrangement, by which the above enumerated faults are avoided. The arms of the levers, A, inside of the casting, B (see Fig. 1), from the fulcrum to the springs, are at an angle with the outside arms; and an upward movement of these outside arms is accompanied by a corresponding downward, and also an inward movement, of the inside arms resting on the springs; therefore, the more the springs are compressed the shorter the effective length of the inside arms will be, thereby increasing the power of the outside arms in the same proportion as the springs get stiffer from compression, thus enabling them to rise the required distance without increase of power. The rod, C, is fastened by a set screw to any distance from the fulcrum, according to the pressure required. Close behind this rod a small pin can be put through the arm, to prevent the engineer from increasing the pressure beyond what the boiler was intended to carry; but as much of the arms as is not in the way of anything, may be allowed to protrude, for the purpose of decreasing the pressure, should any accident to the boiler make it desirable to do so. To keep up a uniform pressure of steam is considered far less injurious to a boiler than the sudden changes, produced by slacking or screwing down safety-valve levers. Such changes will not take place where the improved balance is used.

The springs are made of hard brass wire, expressly drawn for these balances, and are not liable to corrosion, as is the case with steel springs; and, being compressed when working, are far less liable to break or to lose their elasticity.

These balances have been in use for more than a year on several of our leading railroads, where they give entire satisfaction. Patented March 1, 1864. For further particulars address the inventor, Wm. Camerer, Reading Pa.

NEW FORM FOR COINS.

We have seen a sample of a new plan for coins, which consists in making them in the form of the numeral of the denomination which they represent. For example, the one, two, three, four and five-cent coins have the form, respectively, of the numerals

1, 2, 3, 4, 5.

This novel style for coins presents a handsome appearance, and as each piece has its own distinctive form, no confusion in the use can take place. This is more than can be said of the new three-cent coins now being issued by the Government, which are so much like the one-cent pieces that after a short time it is difficult to perceive the difference.

Preservation of Flowers with their Natural Colors.

Dried flowers, in their natural colors, have, for some time past, appeared for sale in the shops. The mode in which the operation is effected is this:—A vessel, with a movable cover, is provided, and, having removed the cover from it, a piece of metallic gauze of moderate fineness is fixed over it, and the cover replaced. A quantity of sand is then taken sufficient to fill the vessel, and passed through a sieve into an iron pot, where it is heated with the addition of a small quantity of stearin, carefully stirred, so as to thoroughly mix the ingredients. The quantity of stearin to be added is at the rate of half a pound to one hundred pounds of sand. Care must be taken not to add too much, as it would sink to the bottom and injure the flowers. The flowers thus become dried, and they retain their color perfectly.

Patent Pin.

The Union Pin Company of Boston, are now extensively manufacturing Tower's patent pins. The improvement consists in making a couple of nicks or indentations on the pin, which cause it to hold more firmly when the pin is inserted in any cloth or fabric. In other respects these pins are similar to those in common use. The improvement finds general favor.

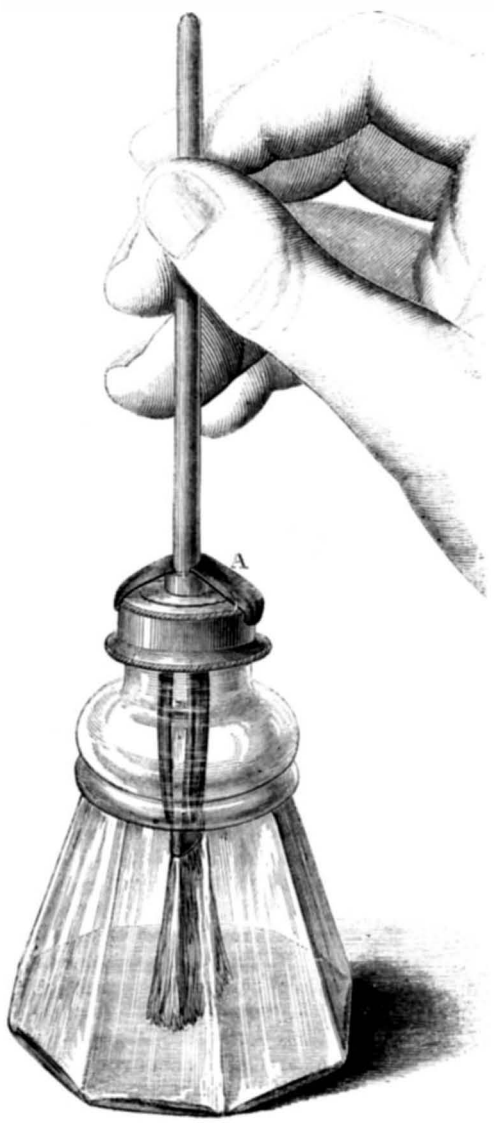
Librarian of the Patent Office.

Prof. W. E. Jillson leaves his position as Librarian of the Patent Office to take that of Assistant Superintendent of the Boston Public Library. He has given general satisfaction in the position from which he is retiring, and his attainments as a linguist and bibliophilist, and his invariable courtesy, make his resignation a loss to the department. He is succeeded by Dr. George C. Schaeffer, who was formerly an Examiner in the Office.

BOSWELL'S MUCILAGE BOTTLE.

Persons who have occasion to use mucilage must have been annoyed by the inconvenient brush as generally made. When the bottle is nearly full, the brush becomes overcharged with the liquid, so that a greater quantity than is necessary is smeared on the paper. The handle of the common brush screws through the cap so as to lengthen or shorten it; but this is of no benefit so far as overloading the brush is concerned.

The engraving published herewith shows a neat device for keeping the brush out of the mucilage, or allowing it to be inserted to a greater or less depth, as desired. The attachment consists of an elastic band of rubber, A, applied to the brush and cap in



such a way that a free movement of the brush is obtained up and down when the handle is pressed upon. So soon, however, as the hold is relaxed, the brush remains at the top of the bottle out of the mucilage entirely.

This is a very neat little affair, and one that will render the use of such things much more agreeable.

It was patented through the Scientific American Patent Agency on August 1, 1865, by E. H. Boswell. For State rights to manufacture, apply to him, at south-east corner of Walnut and Eighth streets, Philadelphia, Pa.

A Novel English Invention.—The last number of the London *Artizan* has an illustration of an air engine, which it calls Messer's air engine. It is precisely the same in principle, and very closely similar in all its details, to the air engine invented by S. H. Roper, of Boston, Mass., which was fully illustrated in this paper on the 14th of February, 1863.

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Contents:

(Illustrations are indicated by an asterisk.)

*McKenney's Apparatus for Burning Petroleum	207	Upin a Balloon	212
Paterson Locomotive	207	Submarine Cables	212
A New Plan for Raising the Atlantic Cable	207	Recent American Patents	213
The Great English Machine Works	208	The Naval Engines	213
The Fair of the American Institute	209	Locomotive Using Petroleum	213
Foreign Summary	209	*Camerer's Safety-valve Balance	214
Notes on New Discoveries and New Appications of Science	210	New Form for Coins	214
*Dibble's Dental Apparatus	210	Preservation of Flowers with their Natural Colors	214
How the *Glasgow* Caught Fire	210	Patent Pin	214
Sea-weed as an Insulator	210	Librarian of the Patent Office	214
Platinum Glass Pots	211	*Boswell's Mucilage Bottle	214
*Chuck to Hold Sheet Metal, Etc.	211	A Secret Telegraph	215
Cement for Aquaria	211	Pistons Without Packing	215
Perfumers	211	Soda Water—What it is and How it is Made	215
Petroleum for Worms	211	Mechanics' and Inventors' Guide	216
An Electric Circuit	212	The *Winooski* and *Algonquin*	216
Action and Reaction	212	Pass Them Around	216
To Preserve the Eyesight	212	Patent Claims	216, 217, 218, 219
		Notes and Queries	220
		Hon. Thomas C. Theaker	222
		Aluminum	222

A SECRET TELEGRAPH.

At the establishment of Mr. Giuseppe Tagliabue, No. 298 Pearl street, New York, there is in operation a telegraph which transmits its messages without allowing them to be read by the operators or any employes of the telegraph company. A merchant or broker in New York is provided with a simple instrument which is furnished with a plain circular alphabet; he moves an index to the first letter of his message, and presses a lever, which punctures a rectangular slot in a roll of paper wrapped upon a cylinder; he then moves the index to the next letter of his message, and punctures another slot; proceeding thus till the message is completed. The roll of paper is then removed from the cylinder and sent to the telegraph office; the boy or girl in attendance wraps it upon the cylinder of the transmitting machine, and starts the machine, which is driven by a weight. As the cylinder revolves, at the opposite end of the line—say in Philadelphia—a narrow strip of paper is carried slowly along through the receiving machine, and the message appears pricked through it in very plain letters. In order that the message may not be read by the employes at the end of the line where it is received, the strip of paper is covered on both sides with very thin black berege, which must be pulled off before the letters can be seen.

This telegraph is the invention of Mr. Robert Boyle, a Scotchman; he commenced work on it in 1852, and for the last three years has given his whole time to it, day and night, as he says, "dreaming about it in the night and working upon it through the day." After all these years of labor and study, the invention is at last completed, and a patent for it, with sixteen claims, has just been obtained through the Scientific American Patent Agency. The patent is granted to Mr. Boyle jointly with Mr. Tagliabue, who took an interest in the invention before its completion.

To make all the details of the mechanism plain would require elaborate engravings; but an idea of the general principle on which it operates may perhaps be given by a brief letter-press description. The punctured paper is wrapped upon a cylinder, which is caused to rotate by a weight. On the same line of shafting with the cylinder, and rotating with it, are two brass wheels, each having fourteen plugs of hard rubber inserted into its periphery. Brass springs, connected with the battery current, rest upon the peripheries of these wheels, the springs being so arranged that the current is reversed twenty-eight times during each revolution of the cylinder. This is the transmitting instrument.

At the opposite end of the line, where the message is received, a permanent horseshoe magnet is delicately suspended between the poles of four electro-magnets connected with the circuit, in such a manner that reversing the current causes the horseshoe magnet to vibrate. Each vibration releases a delicate escapement, and allows the rotation one step—or one twenty-eighth part—of a light steel wheel, on the periphery of which are engraved the twenty-six letters of the alphabet, with the character & and a blank for the space between the words. The letters are formed by rows of fine points.

Before the transmission of the message is commenced, both the transmitting machine and the receiving machine are set at zero, which brings the cylinder, on which the punctured paper is wound, and the type wheel into the same relative position. A brass spring, in connection with a local circuit, has its end pressing upon the cylinder that carries the punctured paper, and the connections are so arranged that while the end of this spring is resting upon the paper the local circuit is broken, but when a slot passes under the end of the spring, allowing it to come in contact with the brass cylinder, the circuit is closed. The closing of this local circuit draws forward an armature, and arrests for an instant the motion of the transmitting machine, thus stopping the frequent reversals of the current, and stopping, at the receiving end, the rotation of the type wheel. At the receiving machine is a magnet, in connection with the main circuit, with its armature so adjusted that the magnetism induced by the momentary reversed currents is not sufficient to overcome the tension of the withdrawing spring, but so soon as the reversals are suspended and the current of the main circuit is allowed to flow continuously in one direction, this tension is overpowered, and the armature is drawn forward. By this motion the paper is drawn down upon the type wheel, and the letter which is uppermost at the time is printed. This motion also breaks for an instant the main circuit, and this break is made to withdraw the stop of the transmitting machine, thus permitting the apparatus to proceed to the next letter.

We have seen this machine in operation on a short circuit, and it worked with perfect success. How it will operate on long lines, and in different conditions of the atmosphere, can, of course, be known only by practical trial.

PISTONS WITHOUT PACKING.

When the first pistons to steam engines were made they were made tight by hemp gaskets—that is, coils of hemp plaited with rope thoroughly slushed or soaked in hot tallow and subsequently driven in as tight as a man striking with a sledge could make them. It was a great step in advance when cast-iron rings were substituted for the hemp and steel springs inserted to keep the rings always up to the cylinder. Quite as much ingenuity and thought have been expended on the pistons of steam engines as upon any other detail, and the variety in shape, form and kind of packing would make an interesting study for the engineer if they were all collected in book form. The pistons of ocean steamers, for instance, have lighter springs than many small engines, and are not packed so tight, by many degrees pressure, in proportion to their areas, as some engines on land. There are few stationary engines in the country which will pass the centers with two or three pounds pressure on the gage, but there are plenty of steamboats that have engines which will do this with ease.

It was formerly the custom to pack locomotive cylinders with brass rings, which had a central lining of Babbitt metal let in. This also is done away with, and the largest works and the heaviest engines on the Erie Railroad, and others, for aught we know, have cast-iron rings.

In many instances pistons have been used without any packing in them—being simply solid disks fitting tightly, yet easily, to the bore. Some concession has been made to prejudices and conventional ideas by turning grooves in the solid piston and depending on the partial condensation of the steam to fill these grooves with water, and thus interpose an obstacle to the passage of steam between the piston and cylinder. It is probable that the evil of a leaky piston has been much exaggerated, for, although it will show on the indicator diagram when very much out of repair, it is a question whether any great amount of fuel is wasted by such a loss. There is no question, however, but that much damage is done to steam cylinders by bad packing, and many can testify to the scored and seamed cylinders that were made so by forcing in the springs.

Air pumps have been made for compressing air with solid pistons, and, reasoning from analogy, there seems no objection to making the pistons of steam engines of a moderate diameter of cylinder entirely solid; in fact, many are now working so made, and those who built them, as well as the owners, find no fault with their performance. On the contrary, rings are frequently a source of trouble, and, taken altogether, with their springs, followers and follower bolts, the piston with metallic packing is a costly detail. If lessening the cost of construction and retaining the vital qualities of any part is an important feature, then the pistons of small steam engines should be made solid.

SODA WATER—WHAT IT IS AND HOW IT IS MADE.

It is, doubtless, understood by most of our readers that the term "soda water," as applied to the sparkling beverage drawn from the numerous fountains in apothecary shops, is a misnomer—the liquid being pure water saturated with carbonic acid under pressure, with not a particle of soda in its composition. Water has the property of absorbing its own volume of carbonic acid at all pressures; and as by doubling the pressure twice the quantity of the gas is compressed in a given volume, the quantity which water will absorb is in direct proportion to the pressure.

The gas is usually obtained by decomposing carbonate of lime, which is a combination of carbonic acid and lime. A quantity of marble dust is placed in a strong cast-iron cylinder, and the opening is closed air-tight by a screw plug, when a quantity of sulphuric acid is let down upon the marble from a vessel opening into the cylinder. The lime, having a stronger affinity for sulphuric than it has for carbonic acid, abandons the latter to combine with the former; the carbonic acid, on being set free from its combination with the lime, takes the gaseous form and becomes carbonic acid gas. The gas thus liberated is compressed in contact with water, when the water is saturated with it, and becomes the mis-named "soda water" of the fountains.

There are two plans for compressing the gas; in one form of apparatus it is done by an air pump, and, in the other, the gas is generated in a close vessel in communication with the water, the pressure being obtained by liberating a sufficient quantity of the gas in a confined space.

The vessel containing the sulphuric acid is lined with lead—that being the only cheap metal which is not acted upon by sulphuric acid. The vessel in which the marble dust and sulphuric acid are mixed together is usually lined with block tin. The gas, before being conveyed to the beverage, is passed through clean water, to remove any impurities with which it may be mingled.

At the fair of the American Institute there is on exhibition a soda-water apparatus, in which the vessel for impregnating the water is lined with glass. As the pressure in this vessel is between 200 and 300 pounds to the square inch, the glass lining would, of course, be bursted, unless effectual means were taken to restrain the pressure. The plan adopted in this case is to open a communication between the interior of this glass lining and the space between this and the inclosing cast iron, so that the pressure is equal on the outside and inside of the glass. It is a very neat and effectual device, and would be perfect if the inventors would carry it a step further, and line the whole apparatus with glass. It is the invention of Messrs. Schultz & Walker, and the apparatus is manufactured by John Matthews, Nos. 437 and 439 First avenue, New York.

On another page, under the heading "Notes on New Discoveries," will be found a description of a new and cheap method of producing carbonic acid, which may be worthy of attention by our soda-water manufacturers.

COAL IN PRUSSIA.—The total production of the colleries of Prussia, in 1864, was estimated at 42,394,500 tuns.

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MECHANICS' AND INVENTORS' GUIDE.

We have lately published a new and convenient volume, of 108 pages, upon Mechanics' Patents and Inventions, which promises to be of much value to all who are of a scientific or inventive turn of mind. Although the proportions of this book are not equal to Webster's dictionary, still we venture to say that so large an amount of valuable information has seldom been collected within so small a compass.

The book contains all the patent laws in full, except repealed or salary sections; the principal official rules and directions for conducting business at the Patent Office; 112 engravings of the best mechanical movements, with descriptions, of great value to mechanics and inventors who study the best construction for machinery; a chapter upon the steam engine, with an engraving of the common condensing engine, with letters of reference and nomenclature of all the parts; instruction in practical geometry; table of the effects of heat upon bodies; table of the pressure and temperature of steam; of the electrical conducting power of various substances; forms for assignment of patents; instructions how to obtain patents and caveats; practical directions and best methods for selling patents; hints upon the value of patents; how to invent; information upon the rights of inventors, patentees, assignees, partners and employers; advice as to foreign patents, extensions, reissues, infringements, together with a variety of other highly useful scientific and mechanical facts and calculations, the whole abundantly illustrated with engravings. Price only 25 cents. Address Munn & Co., 37 Park Row, N. Y.

THE "WINOOSKI" AND "ALGONQUIN."

These two vessels, which have been so long written and talked of, are about commencing their trial for economy of power. It is hardly necessary to recite again all the conditions under which they are to be run—this matter has been alluded to in previous numbers of this journal—suffice it to say, that on Friday last the preliminary trials of the engines took place; that is, the five-hour runs to get ready, and immediately thereafter the ninety-six hour trial was to be entered upon. At the time of our visit the *Algonquin* was turning her wheels vigorously, while the *Winooski*, the naval vessel, was lying still, steam not having been raised. Mr. Dickerson deserves commendation for the energy he displays in looking after his interests; he runs his own engine, aided by others, and takes off his coat and goes at it with a will. The boilers on the *Algonquin* work admirably. The fires were started at 10:18 A. M., and steam started at 10:37; one boiler was cold, the other had water at 120° in it; 1,100 pounds of wood, and 2,000 pounds of coal were consumed in so doing. At 11:45 the engine was started with 45 pounds pressure, and, when we left, was making 16 turns per minute, with 60 pounds of steam, cutting off at points between half stroke (4 feet 4½ inches) and ten inches. We shall publish the results in our next issue.

PASS THEM AROUND.

We have received a number of letters from correspondents in various parts of the country, inclosing a printed puffing circular of "Morton's No-ink Pens," purporting to have been patented in June, 1865, and alleged to be a perfect substitute for ink, and requesting people to remit. The circular contains a strong recommendation, pretended to be quoted from the SCIENTIFIC AMERICAN. C. V. Morton & Co., No. 21 John street, Jersey City, N. J., is one name under which the humbug is conducted.

In reply to our several correspondents, we have to say that no such patent has been granted, nor have we given any such recommendation. On inquiry in Jersey City, that no such firm or place of business was to be found. We further ascertained that the police were on the watch for the scamps, which has caused them to depart from Jersey City. When we last heard of them, their victims were directed to address them at Tarrytown, N. Y.

We hope the postmasters at places where these fellows have been or may be operating will take the necessary steps for their arrest. They have swindled hundreds of people.

ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING SEPTEMBER 19, 1865.

Reported Officially for the Scientific American.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

49,959.—Breech-loading Fire-arm.—E. S. Allin, Springfield, Mass.:

I claim, First, The combination of a solid recoil block, A, with a pinion, U, and rack, m, the first tooth, s, of which is hung on a spring, in the manner and for the purpose described.

Second, Beveling the front end of the recoil block at c', and forming a corresponding bevel, c, on the barrel, as and for the purpose described.

Third, The projection, X, in combination with the lever, f, and hammer, V, substantially in the manner and for the purpose described.

49,960.—Cut-off for Water Conductors.—James Ash, Sterling, Ill.:

I claim the adjustable tube, B, applied in combination with the conductor, A, and discharge pipes, D D', substantially in the manner and for the purpose set forth.

[This invention relates to certain improvements in conductors of water in buildings, and its object is to change the direction of the current from one outlet to another with little trouble or loss of time.]

49,961.—Steam Gage.—Chas. Barnes, Cincinnati, Ohio:

I claim the provision in a steam gage of two or more springs, G H, of unequal tension, arranged and operating in the manner and for the purpose set forth.

49,962.—Mowing Machine.—L. M. Batty, Canton, Ohio:

First, I claim the sliding shifter, L, in combination with the hand lever, d, and the intermitting lever, d', the pinions, k and k', the double clutch, l, and the shaft, z, as herein described, for the purposes set forth.

Second, I claim the swivel-jointed stay rod, E, the upright guide rod, N, with the set bolt and nut, n, and the shoe, H, in combination with the swivel joint, v, when operating as and for the purposes set forth.

Third, I claim the cam lever, F, with the standard and flexible joint, t, as herein set forth.

Fourth, I claim the arrangement of the outer shoe, J, block, T, and set screw, z'', for raising and lowering the shoe independently of the cutter guard, substantially as set forth.

Fifth, I claim the coiled supporting spring, e, with the set screw, f, in combination with the frame, B, as herein described, for the purpose set forth.

49,963.—Harvesting Machine.—L. M. Batty, Canton, Ohio:

First, I claim the seat irons, E, with the set bolts, F, when used as described, for the purposes set forth.

Second, I claim the arrangement of the bevel cogs, G, in combination with the driving wheels, H and H', shafts, H and J, the pinion, K, and clutch, K', the double spur wheel, L, pinion, M or M', and the crank shaft, N, all connected and operated substantially as set forth.

Third, I claim the hand lever, o, with the spring, together with the shifting rod, A, the coiled springs, R and R', in combination with the pinion, K, and clutch, K', when operating conjointly, as described.

Fourth, I claim the arrangement of drag bar, T, with the filling, r, the hook, V, the pin, W, the hanging irons, S and S', the swivel, U, the runner, A, the standard, g, with the slots, g' and p', and flange, j, the set screw, W', and slot, d', the ring, Z, the bolt, Z', the shoe, G', the bed roll, a, the bolts, b, in combination with the finger beam, c, and the lever, d, as set forth, when operating as described.

Fifth, I claim supporting the reel post, e, and carriage, n, by the standard, K fastened by a wedge, v, as described.

Sixth, I claim the segment lever, p', the rack, y'', and the plate, r, in combination with the reel carriage, n, and reel post, e', in the manner and for the purpose set forth.

Seventh, I claim the arrangement of the folding arms of the reel, in connection with the tubular shaft, substantially as described.

Eighth, I claim the springs, y, in combination with the folding arms, S'' and arm holders, u, in the manner and for the purpose set forth.

49,964.—Rake Attachment to Harvesters.—L. M. Batty, Canton, Ohio:

First, The wrought-iron carriage, E, with its pin, h, and box, i, as and for the purpose set forth.

Second, I claim the arrangement of the crooked arm, D D, in combination with the peculiar guides, L and f, for operating the rake, substantially as set forth.

49,965.—Machine for Beveling Picture Frames.—Otis T. Bedell, New York City:

First, I claim the use of mechanism, substantially as herein described, for the purpose of beveling the edges of photographic picture frames by machinery, in contradistinction to performing the labor by hand.

Second, The combination of one or more knives, F, secured to a carriage, E, with the self-acting clamp, H, constructed and operating substantially as and for the purpose set forth.

Third, The vertical knives or cutters, J, in combination with the inclined knife or knives, F, and clamp, H, constructed and operating substantially as and for the purpose specified.

[The object of this invention is a machine intended to bevel off the edges of pasteboard frames, such as are generally inserted in photographic album leaves. These frames are equal in thickness to two photographic cards of that class generally made for the purpose of inserting in photographic albums, and the opening or openings in them are cut out large enough to take in such cards. In order to be able to remove the cards, it is necessary to have one of the ends (generally the lower end) beveled off, for if the edge is left square, and the card or cards inserted into the frame, they can only be removed with great difficulty.]

49,966.—Shipping and Unshipping Hind Boards to Freight Wagons.—Fred'k W. Bishop, West Haven, Conn. Antedated Aug. 31, 1865:

I claim the combination of the spring bolts, c and d, with the strap or loop bands, C and D, when the whole is constructed, arranged and fitted to produce the result substantially as herein described.

49,967.—Feeding Device for Sewing Machines.—James Bolton and Jerome B. Secor, Chicago, Ill.:

We claim, First, The combination of the turning feeding foot or dog and the turning feed guide, for the purpose of changing the direction of the feed of the material to be sown from one line to another at right angles therewith, substantially as described.

We also claim, in combination with a turning feeding foot or dog the studs, or arms, b b', arranged at right angles to each other, so that whether the feeding be longitudinally or latterally of the machine the said foot shall be in working condition with the rod, G, that gives it part of its feeding movement, substantially as described.

We also claim, in combination with a turning feeding foot or dog, the pivoted, slotted and oscillating carrier, M, for giving said foot or dog a part of its feed movement in any of its positions, substantially as described.

We also claim, in combination with a turning feed and the oscillating carrier, the stud or post, u, for guiding and directing the feeding foot, and allowing it to rise and fall thereon, substantially as described.

We also claim the pivoted and adjustable link, L, interposed between the rods, G K, for the purpose of regulating the extent as well as the time of the motion of the carrier, M, substantially as described.

49,968.—Corder for Sewing Machines.—J. W. Brady, Baltimore, Md.:

I claim the corder, E F G H I, substantially as described and represented, and adapted to feed the cord underneath the main fold and into the angle formed between it and the secondary fold.

Second, I claim the combination of the devices, substantially as described, by which the corder shank is moved vertically, laterally, or backward and forward, according to the requirements of this work

49,969.—Apparatus for Packing Rubber for Dental Purposes.—F. C. Brown, Palmyra, N. Y.:

I claim the combination of the piston, B, barrel, A, flask, G, heated bath, H, with the accessories, substantially as described, forming an apparatus for injecting rubber into molds.

I claim the combination of the flask, G, piston, B, barrel, A, and indicator wire, f, substantially as described and represensed.

[The object of this invention is an apparatus intended to force rubber around the teeth in making artificial dentures.]

49,970.—Binding Attachment to Reaping Machines.—Jacob Behel, Rockford, Ill.:

I claim, First, The arrangement of the cog-wheel that transmits motion to the ring carrier of a binding apparatus upon the axle of one the wheels, which holds the ring carrier in its place, substantially as set forth.

Second, The combination, in the same binding apparatus, of a ring carrier and a vibrating tension arm to control the compressing strap, substantially as set forth.

Third, The combination of the ring carrier of a binding apparatus with a strap holder, of suitable size and form to seize and hold the knotted end of a rope-compressing strap, substantially as set forth.

Fourth, The combination of the detachable strap holder with an escapement, which permits the compressing strap to relax its grasp upon the grain and subsequently to be withdrawn from the shear, substantially as set forth.

Fifth, The combination of the twining cord holder with the ring carrier, substantially as set forth.

Sixth, The combination of the twining cord holder and ring carrier with the grooved case, substantially as set forth.

Seventh, I claim the combination of the cord spool and its friction apparatus with a swinging frame and cord guide, substantially as set forth, so that the tension is relaxed by drawing the binding material from the spool.

Eighth, The combination of the proving frame of the tying bill with the fixed framework of the binding apparatus by toggle-jointed links, substantially as set forth.

Ninth, The combination of the slotted plate for holding the cord band with the guide plate for guiding it into the slot of the said plate, substantially as set forth.

Tenth, The combination with the cord holder of a movable protector, substantially as set forth.

Eleventh, The combination of the tying bill and movable knife, substantially as set forth.

Twelfth, The combination of the knife and the instrument for transmitting motion to the escapement of the compressing strap holder, substantially as set forth.

Thirteenth, The combination of a pair of spring dogs upon the ring carrier with a yielding stop upon the framework of the binding apparatus, substantially as set forth.

49,971.—Cork Machine.—Harris Boardman, Lancaster, Pa.:

First, I claim a chamber, G H I, made adjustable in itself, independently from the adjustability of the bed plate, A, operated substantially in the manner and for the purpose set forth.

Second, I claim the construction and operation of the spindles or graspers, V W, and their appliances, arranged and in combination with the cradle, Y, operating jointly, substantially in the manner and for the purposes set forth.

Third, I claim the employment of a tumbler, K o o, hanger, or its equivalent, substantially applied in the manner or for the purpose shown and described.

Fourth, I claim the raising and dropping of the knife, E, for the purpose of giving the finishing cut to the cork, actuated substantially in the manner specified.

49,972.—Coal-mining Machine.—E. K. Bruce and Jno. M. Bruce, Liberty, Pa.:

First, I claim the combination of the frame, B, shafts, E F, bevel gears, c d, drill spindles, C, truck, A, toothed rack, I, and feed shaft, H, all constructed and arranged substantially as and for the purpose specified.

Second, The application to the drills of spiral flanges with gradually increasing pitch, substantially as and for the purpose described.

[This invention relates to a machine which consists of a series of horizontal drills laying parallel with each other, and rotating simultaneously by suitable gearing in the rear of the frame which forms their bearings. The frame moves back and forth, in suitable ways, in the side timbers of a truck, so that the frame can be fed toward or from the bed of coal to be excavated, while the truck rests on wheels, and can be moved in a direction at right angles to the motion of the drill frame.]

49,973.—Machine for Sowing Plaster.—Alpheus Bugbee, Elkhart, Ind.:

I claim the shape and construction of the double forks and stirrers, E, when arranged and combined with the slides, D, and operated as herein described and for the purposes set forth.

I also claim the shield, R, as arranged and combined with the stirrers, E, for the purposes set forth.

49,974.—Sorghum Evaporator.—Ransom Bullard, Litchfield, Mich.:

I claim the combination and arrangement of the slow evaporating section or compartment, b b, of the evaporating pan, the direct flue chamber, g, and the side flues, k k, extending through the brick work, so as to communicate the heat to the evaporating pan through the medium of a slow conductor, substantially as and for the purpose herein specified.

I also claim the described method of constructing and uniting the sections of the evaporating pan, A, substantially as described.

49,975.—Amalgamating Apparatus.—W. H. Butler, Chicago, Ill.:

I claim feeding the quartz into the amalgamating vessel by a forced feed, and holding it immersed or submerged therein by pressure, while it is thoroughly stirred and mixed with the amalgam, using therefor an apparatus constructed and operating substantially as herein described and represented.

49,976.—Harvester Rake.—Wm. J. and Rhutson Case, Pittstown, N. J.:

First, We claim the vibrating upright shaft, D, with rake, J, attached to it, as shown, in connection with the rope, e, connected to the bar, I, and pulley, M, on shaft, N, all arranged either with or without the spring, F, to operate in the manner substantially as and for the purpose set forth.

Second, The arrangement of the wheel, H, provided at its upper surface with teeth, e, and the ledge, p, in connection with the part pinion, o, and shaft, N, for the purpose specified.

[This invention relates to a new and improved automatic raking device for harvesters, and it consists in a novel means employed for operating the rake, and in a peculiar arrangement of the same, whereby the cut grain may be raked from the platform without materially increasing the draught of the machine, and without interfering with the other working parts thereof.]

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49,977.—Washing Compound.—R. W. Chappell, Chicago, Ill.:

I claim a washing compound, composed of the herein-described ingredients, in the proportions substantially as herein described and specified.

49,978.—Implements for Contracting the Barrels of Watch Main Springs.—Andrew S. Clackner, Rochester, N. Y.:

First, I claim constructing the barrels of watch main springs by forcing the same within a circular tapering cavity by means of a plunger or other equivalent device.

Second, I claim, in combination with a circular tapering cavity, as above set forth, a follower, constructed substantially as described.

49,979.—Oil Can.—Benjamin Clark, New York City:

I claim an oil can, having a spring, B, and a lined elastic diaphragm, protected by a guard, A, all substantially as shown and described.

49,980.—Knitting Machine.—Wm. W. Clay, Philadelphia, Pa.:

First, I claim the combination of the hooked carriers, F, the cams herein described, or their equivalents, for operating the said carriers and the self-acting needles, whether the latter are arranged to operate in parallel grooves, in conjunction with a reciprocating thread carrier, or in radial grooves, in conjunction with a rotating thread carrier, all substantially as described.

Second, The bed plate, A, its opening, a, and grooves, b, with the inclined edges, x, adapted for the reception and operation of the needles, D, and carrier, F, substantially as specified.

Third, The combination of the said movable cams with the pattern wheels when the latter are operated by the machine, through the medium of the devices herein described, or the equivalent to the same, for the purpose specified

49,981.—Planing Machine.—Jeremiah Close, Brooklyn, N. Y.:

I claim the relative arrangement of the adjustable feed rollers, the form or guide, E2, with the cutter head, B, and cutters, c c, when operated for the purposes substantially as described.

49,982.—Hinge.—Jeremiah Close and Ira Buckman, Jr., Brooklyn, N. Y.:

In a hinge composed of three leaves and two pintles, we claim operating the two outer leaves by a power located within a cavity or cavities in said central leaf, substantially as described.

We claim a hinge, formed with three levers and two pintles, as described, the spring or springs of which are located in a cavity or cavities, formed in the central leaf, in combination with the wrench or forked spring holder, E the collar, F, the grooved pulley, D, the wrench or capstan, N, the chain, C, and smaller grooved pulley, D, on the shaft of the outside leaf, B, substantially as and for the purposes herein set forth.

49,983.—Lubricating Compound for Journal Boxes, Etc.—Hall Colby, New York City:

First, I claim the use of a lubricator composed of asbestos and plumbago mingled with a liquid so as to be capable of being applied to journal boxes and other rubbing surfaces in the manner substantially as hereinbefore described.

Second, The use of a fabric made from asbestos, and without any combustable substance incorporated therewith, to be interposed between rubbing surfaces, and saturated with the lubricator above-described, in order to produce an anti-friction surface for the journals of heavy machinery and other like purposes, substantially as described.

49,984.—Lamp.—M. H. Collins, Chelsea, Mass.:

I claim the improved lamp as not only constructed with its cone or deflector, E, and its chimney rest, D, and chimney, arranged with respect to each other, as described, but as having the said deflector provided with peripheral springs, or the same, and the slits, h h, and the said rest, D, made concavo-convex, and provided with an annular groove or lid at bottom for supporting the chimney, the whole being substantially as described and represented.

49,985.—Weeding Hoe.—Charles Crofut, Weston, Conn.:

I claim the adjustable arrangement of the serrated gib, E, and stem, D, with the plain gib, F, and key, G, in the manner and for the purpose substantially as herein described.

49,986.—Umbrella.—Wm. Damerel, Brooklyn, N. Y.:

First, I claim in umbrellas and parasols so securing on the stick the crown piece or other device to which the upper ends of the ribs of such articles are attached as that the said crown piece and the parts attached to it shall be capable of rotating on the stick, substantially as described.

Second, I also claim, in combination with the crown piece, D, the collar, G G, with the longitudinal flanges, a a, and a cap, E, for inclosing the upper edge of the covering, C, and confining it to the crown piece, substantially as described.

49,987.—Ferrule for Boiler Tubes.—Geo. W. Durall, Norfolk, Va.:

I claim a screw or screws, B, in combination with a cylinder in one or more parts, for the purposes specified, substantially as described.

49,988.—Spinning Machine.—James Eaton, Boston, Mass.:

I claim a cylindrical spindle, either solid or tubular, of a mule or other spinning frame, provided with a helical tip, as herein set forth.

I also claim the cylindrical tube or bobbin, either with or without the ferrule or band, R, in combination with a spindle having a helical tip.

I also claim the combination of the cylindrical tube or bobbin, O, with a cylinder having a helical tip, or its equivalent, substantially as herein described and for the purpose specified.

49,989.—Decarbonizing Clay Retort.—G. W. Edge, Jersey City, N. J.:

I claim the use of a mixture of steam and air, produced by means substantially such as herein described, or any other equivalent means, and injected into a retort, for the purpose of decarbonization, as set forth.

49,990.—Clutch or Rope Holder.—C. A. Emery, Springfield, Mass.:

I claim the device constructed, arranged and operating substantially as shown and explained and for the purpose specified.

49,991.—Lock.—Jacob Euteneur, Peoria, Ill.:

First, I claim the two arms, H H', attached to the hub, G, provided with the pivoted bars, I I, and connected with the latch, C, as shown, in combination with the two bell hammers, M M', bell, N, and lever, L, the rods, J M, of the hammers being attached to arbors, g i, provided with projections, f h, and all arranged substantially as and for the purpose specified.

Second, The plate or key-hole guard, Q, in combination with the rod or bar, R, arranged and applied to the lock, substantially as and for the purpose set forth.

49,992.—Sleeping Car.—Ben Field, Albion, N. Y., and G. M. Pullman, Chicago, Ill.:

We claim, First, Constructing a car seat, with back and seat cushions hinged together, and disconnected with said seat, so that the back cushion may be placed on the seat, and the seat cushion extended to meet the seat cushion of the opposite chair, in the manner and for the purpose herein set forth.

Second, The berth, A, connected to the side of the car by hinges, B, and supported by jointed suspenders, C, so as to be turned up into an inclined position during the day, and lowered to a horizontal position at night, all as herein described and for the purposes set forth.

49,993.—Lamp Chimney.—J. G. Floyd, Keokuk, Iowa:

I claim the within-described new article of manufacture, to wit, a lamp chimney, with a hole or holes in its sides or parietes thereof, as set forth and described, or when constructed with any other holes in its sides, designed for the same purpose.

49,994.—Cartridge Retractor for Breech-loading Firearms.—G. P. and G. F. Foster, Mohawk, N. Y.:

First, I claim the expelling pin, P, in combination with the spring, Q, and sere, R, operating substantially in the manner described.

Second, The sere, R, actuated to free the expelling pin by impingement upon a projection during the vibration of the breech block.

Third, The expelling pin, P, retracted in the upward vibration of the breech block, and reset by the spring sere, substantially as described.

49,995.—Method of Treating Oil Wells for the Removal of Paraffine.—J. Fraser, Buffalo, N. Y.:

I claim the employment of carbonic oxide for treating petroleum wells to remove obstructions, composed of paraffine and other deposit, substantially as set forth.

49,996.—Bottle Stopper.—Charles Goldthwait, South Weymouth, Mass.:

I claim a metallic mounting for bottle corks, composed of a cap, D, and plate, E, and either with a metal plate, b, or a wax covering, c, all arranged and applied substantially as and for the purpose herein set forth.

[This invention relates to a new and improved mounting or metal attachment for cork stoppers for bottles, whereby the corks are rendered extremely durable, capable of being readily drawn from the bottles, and enabled to stop the bottles much tighter than usual.]

49,997.—Combined Seed Sower and Stalk Cutter.—B. A. Grant, Mount Pleasant, Iowa:

First, I claim the combination and arrangement of the crank, M, provided with the lever, N, the slide bar, L, the rods, J J, and the plow standards, F F, when all constructed and operating substantially as set forth.

Second, The combination and arrangement of the lever, R, arm, S, the connecting bow, T, and beams, D D, when constructed substantially as herein specified and described.

Third, The combination and arrangement of the beams, D D, with the corn-stalk cutter, U, when constructed and operating substantially as herein set forth.

49,998.—Sugar Cane Mill.—James Harris, Janesville, Wis.:

First, I claim the combination of the sliding box, K, bolt, b, spring, a, and yoke, L, with the nut, e, for the purpose of making the mill either rigid or elastic at pleasure, substantially as set forth.

Second, Securing and adjusting the spring attachment of a roller bearing by means of the yoke, L and set screw, d, substantially as set forth.

49,999.—Extension Lever Jack.—W. H. Hartman, Fostario, Ohio:

I claim the dogs, h and g, spring, f, band, e, stirrup, e, in combination with the lever, E, and standard, C, when constructed, arranged and operating as and for the purpose substantially as set forth.

50,000.—Manufacture of Candles from Paraffine.—Chas. Havard, New York City:

I claim a new and improved process for making candles or blocks from the paraffine of petroleum, as herein described, using for that purpose the aforesaid ingredients or composition of matter, or any other substantially the same, and which will produce the intended effect.

50,001.—Rock-drilling Machine.—Robert Hood, Dayton, Ohio:

First, I claim the use of a spiral lifter, B, in combination with one or more drills or drill rods, constructed and operating substantially as and for the purposes described.

Second, The cam grooves, l, and sleeves, j, with arms, k, and tappets, l, in combination with the spiral lifter, B constructed and operating substantially as and for the purposes set forth.

50,002.—Chimney Cap.—William Henry Horton, Jersey City, N. J.:

I claim the inner cap, A, closed at the apex and open at the sides, and the outer cap, B, open at the top and bottom, while its sides cover the apertures in the inner cap, substantially as and for the purpose herein specified.

50,003.—Wind Wheel.—John A. Hubbard, West Moulton, Me.:

I claim, First, A wind wheel provided with oblique buckets, b, in connection with a vane, D, having a shield, E, attached and arranged to operate in the manner substantially as and for the purpose set forth.

Second, The gate, F, and wind wheel, C, constructed, arranged and operating in the manner substantially as and for the purpose set forth.

Third, The supplementary wind wheel, L, combined and arranged with the shaft, J, and with the cone, M, having the weight, N attached and connected with the gate, F, substantially as and for the purpose specified.

50,004.—Fog Alarm.—George Hull, Wallingford, Conn.:

I claim the combination of a coil of tubing, C, and one or more whistles, E, when constructed and arranged in the manner described, so as to sound a prolonged alarm, for the purpose specified.

50,005.—Gate Post.—G. O. Hutson, Iowa City, Iowa:

I claim the combination of the gate post provided with shouiders or grooves, the bearers attached to the lower portion of the gate, and the band which forms the upper support, substantially as described and represented.

50,006.—Compound for Destroying Vermin.—J. Burrows Hyde, New York City:

I claim a mixture of extract of tobacco and petroleum, for the purposes set forth.

50,007.—Saddle Stirrip.—Andrew Ivion, Femme Osage, Mo.:

I claim, First, A stirrup made in two separate parts, hinged together at the bottom as described in the foregoing specification.

Second, The several parts of the stirrup, viz., the side pieces, A and A, the bottom piece, B, the spring, h, and the lugs, W and X, or their equivalents, when constructed and arranged as and for the purpose set forth.

50,008.—Shoe Lacing.—Timothy J. Kelleher, Boston, Mass.:

I claim the above described improved arrangement of the studs and the lacings with respect to the two flaps of the opening.

I also claim the combination and arrangement of the flies and the studs with the two flaps, or the same and the lacing of the said opening, as explained.

50,009.—Churn.—Elisha Kenney, Livermore, Me.:

I claim, First, The arrangement herein described of the gear mechanism in reference to the dasher, in combination with the adjuster guide, substantially as set forth.

Second, The construction, arrangement and operation of the reciprocating dasher of churns, as described—that is to say, forming the same of bevel faces or inclined planes, in combination with apertures, substantially as set forth.

50,010.—Car Coupling.—John Lacey and George Watkins, Bristol, Wis. Antedated Sept. 10, 1865:

First, We claim the hook, B, arranged in respect to the drawhead, A, and operating substantially as and for the purposes set forth and shown.

Second, We claim the employment of two hooks, B B, combined and arranged with the drawheads, A A, substantially as and for the purposes delineated and set forth.

Third, We claim the combination and arrangement of the drawheads, A A, the hooks, B B, slots, C, rods, D, and blocks, E, as and for the purposes shown and described

50,011.—Instrument for Opening Sealed and other Cans.—Samuel D. Lecompte, Leavenworth City, Kansas:

I claim an instrument for opening fruit and other sealed cans, constructed substantially as herein shown and described.

[This invention consists in the construction of a simple and easily operated instrument for opening that class of cans used for putting up fruits, preserves, etc., the same consisting of a bar provided with a suitable knife, which is adjustable, and one end pointed and bent in such a manner that a fulcrum will be provided in which to turn the instrument after the said end has been thrust through the top of the can.]

50,012.—Stop Motion for Knitting Machines.—Mark Lee, Needham, Mass.:

I claim the improved stop motion composed of the upright stand, A, the bars, E E, with the yarn scraper, F, the dropper or bar, H, and the bar, K, together with their appendages, constructed, arranged and combined so as to be used in connection with any loom or machine for making knitted cloth, substantially as herein specified.

50,013.—Mode of Supplying Railway Trains with Water.—Lewis H. Lezott, Washington, D. C.:

I claim the arrangement and combination of the sliding gate, D, with its grooved posts, C, lever, G, spring, J, and pump rod, K, the whole being attached to a railway, and operated by the passage of the cars, as herein described and for the purposes set forth.

50,014.—Artificial Hand.—Oliver Lindsay and Isaac Vance, Washington, Pa.:

We claim the steel ligatures, slide bar and ratchet, or series, in combination with the artificial finger joints, enabling the hand to operate as desired, and also the socket, as above described.

50,015.—Lubricating Compound.—Isaac Losslel, Philadelphia, Pa.:

I claim a lubricating compound consisting of the combination of the ingredients herein described, in the proportions substantially as specified.

50,016.—Weather Strip for Doors.—Isaac F. A. A. Lynch, Roxbury, Mass.:

I claim the improved weather strip as made with the strip of elastic material or india rubber, c c, to project in opposite directions from the lower and rear sides of the holder, substantially in manner as described.

And in combination with the elastic strip, c c, to project from the rear part of the holder, as described, I claim the rebate, d, made in the holder, and arranged with reference to the said elastic strip, substantially as specified.

50,017.—Trace Buckle.—David F. Maine, Mansfield, Ohio:

First, I claim the use of a vise, constructed substantially as described, and for the purposes mentioned above.

Second, I claim the cam and spring, constructed and used substantially as above described.

50,018.—Cultivator.—Abraham J. Manny, Freeport, Ill.:

First, I claim the employment of the lever, E, the bar, 6, and the yoke, F, or its equivalent, for the purpose of giving direction to the machine from the seat, as is herein fully set forth.

Second, Attaching the plow beams to the hounds or side-pieces, A A, in such a manner that said beams can be brought closer together or separated by moving them forward or backward, as is herein represented.

Third, The combination of the triangular frame, with the devices for changing the direction of the machine, as and for the purpose specified.

Fourth, The combination of the levers, G and H H, with the plow beams, as and for the purpose herein specified.

50,019.—Lamp.—Charles F. Martine, Dorchester, Mass. Antedated Sept. 10, 1865:

I claim the perforated cylinder, B, with its flange or ring, c, in combination with a non-conducting base or support, b, to which the perforated cylinder is attached, operating substantially as set forth, for the purpose specified.

50,020.—Rock Drill.—John M. May, Janesville, Wis.:

I claim, First, Covering the face of broken pulleys used to hit and set tree drills, and for other similar purposes, with leather, india-rubber, or other suitable slightly elastic material, substantially as and for the purposes described.

Second, A non-elastic or rigid bar faced with leather, rubber, or other suitably elastic material, on its sides next to metallic pulleys, when used with metallic-faced pulleys, substantially as and for the purposes described.

Third, A hollow bar to receive the spindle of a drill, when the hollow bar is operated between broken pulleys, the hollow bar and spindle serving as a swivel to allow the drill and spindle to be revolved horizontally at the same time it is operated vertically as the drilling process.

Fourth, A gripe or vise connected by a swivel to the operating mechanism of a drill, when the vise is constructed substantially as and for the purposes described.

Fifth, The general arrangement of the pulleys, B' B', bar, L, shafts, C C, guides, S S and R, when combined and operated substantially as and for the purposes described.

Sixth, Elastic washer, m, of rubber, or its equivalent, between the top of bar, T, and washer, m', in Fig. 4, when used as and for the purposes described.

50,021.—Screw Driver.—James S. McCurdy, Bridgeport, Conn.:

I claim, as a new article of manufacture, the screw driver as constructed with slotted handle and with a blade, having two or more points pivoted into such handle, substantially as herein described.

50,022.—Construction of Cans.—Henry W. Millar, Utica, N. Y.:

I claim constructing the bottom and securing the same to the body of the can in the manner shown and described.

[This invention consists in constructing a bottom for a can, pail or other metallic vessel, in a conical form, or in the form of a frustrum of a cone, its apex or point extending upward into the cone, so as to strengthen the resisting power of the bottom, and, also, where it may be desirable, to afford a better opportunity for drawing off the entire contents of the can by faucet or the like.]

50,023.—Grate Bar Supporter.—W. F. Morgan and F. C. Bartlett, New York City. Antedated Sept. 6, 1865:

We claim, in combination with a grate bar or fagot of bars of any convenient form, the application of the truss bar, a, with the space, C, intervening between it and the main bars, B, and with the loops, X, or their equivalents, supporting the truss bar, a, in such manner that the expansion and contraction of the latter shall be allowed by sliding one upon the other, substantially as herein set forth

50,024.—Spinning Jack.—H. L. Moulton, Camden, N. J.:

First, I claim the sliding bars, R and R', constructed and arranged in respect to each other substantially as described, and provided with such appliances that they shall be simultaneously elevated as the carriage approaches the limit of its inward movement, while one of the bars is at liberty to be depressed after the carriage has commenced its outward movement, without disturbing the other bar, all substantially as and for the purpose herein set forth.

Second, The combination of the bars, R and R', their wheels, Q and Q', operated by the worms, i, or their equivalents, and having adjustable pins, X' and X', together with the spring rods, V and V', the whole being arranged, constructed and operated substantially as and for the purpose herein described.

Third, The vertical bar, R, in combination with the clutch, c, on the driving shaft, and the devices herein described, or their equivalents, through the medium of which the bar, R, is caused to operate the said clutch.

Fourth, The combination of the clutch, c, on the driving shaft, with the system of delivering rollers, and the intermediate system of gearing described, or its equivalent, whereby a positive motion and certain starting and stopping of the delivering rollers are effected.

50,025.—Flour Sifter.—James Myers, Jr., New York City:

I claim a sieve for family use, constructed in the form of a semi-sphere and provided with an oscillating frame, the lower part of which has a curved rod corresponding with the curvature of the sieve and having upon it a series of spheres or balls, all arranged substantially as shown and described.

50,026.—Boot Heel.—Erastus Niwhall, Lynn, Mass.:

I claim the construction of a heel, for boots or shoes, of vulcanized rubber, or its compounds, or other vulcanizable material, with a core of wood, substantially as and for the purpose specified.

50,027.—Fruit Jar.—P. Pallissard, St. Anne, Ill.:

I claim the hooked straps, f f, catching under the flange, g, of the bottle, and perforated to receive the notched bridge piece, d, as herein described.

Second The lateral openings, a' b', arranged in relation to the vertical openings, a b, in the corner, in the manner and for the purposes herein specified.

[This invention relates particularly to the means of filling the jar and of closing down its top. The top is provided with two openings, passing clear through it, one being intended to introduce the liquid with which the jar is to be filled, and the other to let the air escape from the interior of said jar. A bridge bar—the notched end of which catch is slotted hook straps, and which is provided with a suitable set screw—serves to press the top down upon the neck of the jar. The hook straps catch under the bead which encircles the neck, and they are easily removed and attached to jars of different size and diameter.]

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50,028.—Bolt Machine.—Hugh M. Phillips, Indianapolis, Ind.:

First, I claim the bolt anvil, as described, when operating in connection with the gage] block, G, substantially as and for the purposes set forth.

Second, The die rest, K, operating in connection with the die, B B, to prevent the samefrom opening while the head is being formed, substantially as set forth

50,029.—Apparatus for Carbureting Air.—E. A. Pond and M. S. Richardson, Rutland, Vt.:

First, In machines for generating illuminating gas by charging atmospheric air or hydrogen with the vapor of hydro-carbon fluids, we claim the employment of a vaporizer composed of pipe or tube, coated spirally, or otherwise, as and for the purposes hereinbefore set forth.

Second, In machines for generating illuminating gas by charging atmospheric air or hydrogen with vapor of hydro-carbon fluids, we claim, in combination with the tubular vapoiizer, as described, a supply reservoir to maintain said vaporizor constantly filled, substantially as herein set forth.

Third, In machines for generating illuminating gas by charging atmospheric air or hydrogen with the vapors of hydro-carbon fluids, we claim the employment of an elastic or flexible air-diaphragm air-pump constructed and arranged for operation substantially as herein set forth.

Fourth, In machines for generating illuminating gas by charging atmospheric air or hydrogen with the vapor of hydro-carbon fluids, we claim the employment, in combination with an air or gas pump, of a clock work, or other spring-power mechanism, arranged to operate the said pump, substantially as and for the purpose set forth.

Fifth, In machines for generating illuminating gas by charging atmospheric air or hydrogen with the vapor of hydro-carbon fluids, we claim the combination of the following elements:—

First, A flexible or elastic diaphragm pump, or other pump, operating without the use of water or other liquid.

Second, A tubular vaporizer, substantially such as herein described; and,

Third, A spring-power mechanism to operate the pump, substantially as described.

50,030.—Gaiter Boots.—Thomas Powell, Richland, Ind.:

I claim the employment or use in gaiters or shoes of a double-folding gore, B, stitched by the side of a vertical cut or slit made in the upper leather from the top downward, at the rear of the gaiter or shoe, and either with or without the horizontal cut, substantially as and for the purpose set forth.

50,031.—Snow Plow.—E. A. Putnam, Oakfield, Wis.:

I claim, First, The application to a car truck or railroad car of plows, arranged in such a manner that they may swing or work on pivots on a shaft, and by means of springs, or their equivalents, be kept to their work, and still allowed to pass over obstructions, substantially as set forth,

Second, The bars, B, provided with inclined surfaces and having the springs and plows attached to them in such a manner that the plows may be raised by moving or sliding the bars, and without meeting with any resistance from the springs, substantially as described.

Third, Operating the sliding bars, B, through the medium of the cranks and slotted plates, substantially as set forth.

[This invention relates to a new and improved plow for removing the snow from the inner sides of the rails, where the flanges of the wheels run. The invention consists in applying plows to a car truck in such a manner that they will be held down to their work with sufficient pressure to remove the snow, and at the same time be allowed to yield or give to obstructions, such, for instance, as a road-crossing or a switch track.]

50,032.—Barber's Chair and Stool.—Henry Remick, Portsmouth, N. H.:

I claim, First, The chair, A, constructed with folding legs and with receptacles, substantially as above described.

Second, I also claim the stool, P, constructed substantially as above described.

Third, I also claim the combination of the chair, A, and stool, P, substantially as above shown.

Fourth, I also claim the rests for the feet, W, constructed with an upholstered and a barred side, substantially as shown.

50,033.—Feed-water Apparatus.—G. Adolph Riedel, Philadelphia, Pa. Antedated May 11, 1865:

I claim, First, The vertical reciprocating receiver, c, constructed, arranged and operating substantially as described and for the purpose set forth.

Second, The combination of the rod, I, with the receiver, for the purpose of opening and closing the communication between the feed pipe and the pump or injector, substantially as described.

50,034.—Automatic Boiler Feeder.—G. Adolph Riedel, Philadelphia, Pa. Antedated July 26, 1865:

I claim, First, The oscillating receiver, H, for opening and closing the communication between the feed-pipe and boiler, combined and arranged with the valves, C F and L, substantially upon the principle and in the manner above set forth.

Second, The lever, M, constructed substantially as described, and combined and arranged with the receiver, H, and valve, L, as and for the purposes above set forth.

50,035.—Automatic Boiler Feeder.—G. Adolph Riedel, Philadelphia, Pa. Antedated, May 11, 1865:

I claim the combination and arrangement of the receiver, C, with the valves, E E', pipes, B B', and levers, K K', with reference to the feed-pipe and boiler substantially upon the principle and in the manner herein set forth

50,036.—Machine for Manufacturing Sheet Lead.—John Robertson, Brooklyn, N. Y.:

I claim the arrangement of the water cylinder, the ram, the adjustable dies, and the supporting and adjusting nut of the central bolt which carries the male die, substantially as herein described, whereby provision is made for forcing out the lead in a downward direction, and convenience is afforded for adjusting the dies to regulate the thickness.

50,037.—Compass.—Paul Roessler, New Haven, Conn.:

I claim a reversable socket, presenting at one end a steel point and at the other a pencil, substantially as and for the purposes specified.

50,038.—Cigar Wrapper.—Cristopher E. Roffee, Barrington, R. I.:

I claim making an artificial wrapper for cigars, by covering the common brown paper of commerce with a coating of paste made from tobacco, in the manner substantially as described.

50,039.—Composition for Refining and Hardening Steel.—Henry Rescoe, New York City:

I claim, First, The use of a composition, consisting of chlorate of potash and carbonate of soda, for hardening and refining steel.

Second, The use of borax, in connection with either chlorate of potash or carbonate of soda, or both combined.

[This invention relates to a composition which will render common steel fit for good tools—which will restore steel that has been destroyed by overheating, and which prevents steel from cracking in hardening.]

50,040.—Fleece Folder.—Charles W. Rudgers, Brecksville, Ohio:

I claim the hinged head block, D, and adjustable follower, H, in combination with the leaves, C, strap, F, and spring, B, or its equivalent, operating as and for the purpose set forth.

50,041.—Hand Loom.—John Seaman and Wm. Y. Henderson, Andover, N. Y.:

We claim, First, The drivers, t t', and cam disks, a2 a2', in combination with the lay, L, and with the shutter of a loom, constructed and operating substantially as herein described.

Second, The method herein described of producing the motion of the heddles and that of the shuttle by the action of the batten, as and for the purpose set forth.

50,042.—Piano Stool.—George A. Sherlock, New York City:

I claim arranging the seat of a piano-forte stool upon its body in substantially the manner described and for the purpose specified.

I also claim, in combination with the above, the use of the guards, r r, for the purpose explained.

[This invention consists in so arranging the seat of a pianoforte stool upon its body portion that it can be readily adjusted and set at any desired hight from the floor, so as to adapt it to the varying hights of persons using it.]

50,043.—Graduating Boot and Shoe Patterns.—Nathaniel Silvester, Boston, Mass.:

I claim, First, The steps or graduators, constructed and arranged substantially as described, for the purpose of graduating boot and shoe patterns.

Second, The combination and arrangement of the arms, A B, graduated scale, C, and graduations, a b c d e f, or their equivalents, substantially as set forth and for the purpose described.

50,044.—Spinning Jack.—Augustus and George Simpson, Woonsocket Falls, R. I.:

We claim the disk wheel, C, and tappet, F, in combination with a spring latch, G, or their equivalents, arranged to operate substantially as described, for the purposes specified.

50,045.—Auger Handle.—D. Y. Smith, Joliet, Ill.:

I claim, in combination with the auger shank and head, and the handle and slotted turning band, the cam swell or ledge margining the slot, d, so as to compensate for, and take up, all the wear between the shank and its socket, and hold the auger always tightly to its handle, substantially as described.

50,046.—Means of Attaching Sheer Poles to Standing Rigging.—Edward Smith, New York City:

I claim the attachment of the sheer pole to the lower part of each of the sockets, B B, which receive the shrouds, by means of two links, C C, one in each side of the socket, the said links being attached to the said socket by means of the joint pins, c c, which connect the said socket with the dead eye, all substantially as herein described.

50,047.—Baling Apparatus for Packing Tobacco.—I. H. Stone, St. Louis, Mo.:

First, I claim the retaining bars, E, and keys, x, for the purpose of holding the case together so it can be removed from the press as soon as the pressing operation is performed.

Second, I claim the employment of the T-lever, M, and the hinged props, L, in connection with the posts, L', and hooks, i, and plate, i', as and for the purpose set forth.

Third, I claim the joint bolts, b, when constructed and used as and for the purpose herein described.

50,048.—Breech-loading Fire-arm.—T. L. Sturtevant, Boston, Mass.:

I claim the combination for elevating the barrel, and operating the cartridge-shell discharger, in manner as described, the same consisting of the lever, D, the spring, h, the stud, i, and the spring latch, k, the whole being arranged together substantially as set forth.

50,049.—Lubricating Compound.—David C. Taylor, Goshen, N. Y.:

I claim a lubricating compound, made of the ingredients herein set forth, and mixed together in the manner and about in the proportion specified.

[This invention relates to a compound which may be used to advantage for journals or bearings of any desired description, and which is particularly intended to [prevent said bearings from running hot.]

50,050.—Snow Shovel.—D. N. Thayer, Mayville, N. Y.:

First, I claim a snow shovel, which is provided with a guard, C, extending transversely across its palm, and also a handle, c, or its equivalent, substantially as described.

Second, In a shovel, in which the handle and blade are on a straight line, and in the same piece, I claim the hand protector, d, applied to the guard, C, substantially as and for the purpose described.

50,051.—Car Brake.—W. W. Todd and John Vandercar, Brooklyn, N. Y.:

We claim the segmental cogged plates, A A', operated by the foot, at either or both ends of the car at the same time, by means of levers, 1 2 3 4, arranged in the manner and for the purpose substantially as described and shown in the drawings.

50,052.—Cultivator.—J. P. Tostevin, Racine, Wis.:

First, I claim the combination and arrangement of the tongue, A, when extending back and joined to the cross piece, C, substantially as shown, the bolts, J J, the set screw, K, and frame, B, when constructed and operating substantially as and for the purposes set forth.

Second, The combination and arrangement of the cross piece, C, provided with the slot, a, the T-bolt, H, plow standard, E, provided with the slot, b, base, F, and rod, D, when operating substantially as described.

Third, The combination and arrangement of the cogged sectors, N and O, with the wheel and frame of the cultivator, when operating substantially as herein specified.

Fourth, The combination and arrangement of the lever, L, slide rod, U, notched standard, R, shaft, X, and sector, N, when constructed and operating substantially as and for the purposes herein set forth.

50,053.—Valve of Steam Engine.—C. W. Tremain, Memphis, Tenn.:

First, I claim the cylindrical steam chest, H, with grooves or pipes, A, partly encircling it, the same forming steam passages to the cylinder, substantially as described.

Second, I also claim, in combination with the groovs, A, the projections, B B, which cover them, said projections forming seats for the valves or rings, R, and being perforated with numerous diagonal holes for the passage of steam, substantially as described.

Third, I also claim in cylindrical valves which have reciprocating motions in their chests, making openings throughout their length, to permit steam or other fluids to pass to that end of the chest which is furthest from the induction passage, I, substantially as described.

50,054.—Flour Sifter.—L. W. Turner, Meriden, Conn.:

I claim, as a new article of manufacture, a flour sifter, composed of a suitable case, a conical sieve and a revolving frame, when the frame is composed of spirally fitted blades, and a brush or brushes, and the whole is fitted for use, substantially as herein described.

50,055.—Beer Cooler.—Francis Uhrland, Buffalo, N. Y.:

First, I claim a beer cooler, with an adjustable cover, substantially and for the purposes herein described.

Second, I claim the main tube, E, and the cover, A, in combination with tubes or pipes, D D D D, heads, B and C, substantially and for the purposes herein set forth.

50,056.—Beer Cooler.—Gardner Waters.—Cincinnati, Ohio:

I claim the cooling of beer or other liquids, by passing the same continuously through a cooling medium, or, vice versa, the cooling medium through the beer, by means of the rotating lantern cylinder, B, or its equivalent, and the outer case, A, combined and arranged for the purpose, substantially as herein specified.

50,057.—Shoe.—Fitch Weed, Middleboro, Mass.:

I claim a shoe, as made with the back piece, e, inverted between and sewed to each of the quarters, a a, of the upper, and running from the top down to the heel of the sole, substantially as hereinbefore specified.

50,058.—Instrument for Canceling Postage and Revenue Stamps.—C. S. Wells, Chicopee, Mass.:

I claim the tube, D, provided with a spiral groove or slot, d, and having a cutter, e, at its lower end, in combination with the rod, C, provided with a lateral pin, c, fitted in the groove or slot, d, of the tube, D, the above parts being within a case, A, which constitute a gage resting firmly on the paper, and remaining stationary, while the cutter turns within it, and all arranged in connection with a spring, E, to operate in manner substantially as and for the purpose herein set forth.

50,059.—Trunk.—J. H. Whitfield, Buffalo, N. Y. Antedated Sept. 15, 1865:

I claim a double trunk, opening front and back, with the cot opening in front, the cot having double bars, D and E, of wood and iron, stays, I, at their joints, and folding legs, L, with hooked stays, M, and the lid, B, as a rest or place for the pillow, and shelter for the head, when arranged and combined as herein described, and for the purposes set forth.

50,060.—Horse Rake.—H. C. Whitney, Coxsackie, N. Y.:

I claim the combination of the revolving rake head, g, lever, k, forks, l l, and projections or cams, i, with the arms, f, and lever, s, substantially as specified.

50,061.—Air Engine.—Stephen Wilcox, Jr., Westerley, R. I. Antedated Sept. 9, 1865:

First, I claim automatically regulatin the proportions of air passing over and through the fire, by the variations in the pressure of the air, substantially in the manner and for the purpose herein set forth.

Second, I claim causing the induction valve, I, to act as a variable throttle valve while maintaining a uniform or nearly uniform point of cut-off, substantially in the manner and for the purpose herein set forth.

Third, I claim mounting the safety valve, o, on the compressing piston, a2, of a hot-air engine, substantially as and for the purpose herein set forth.

Fourth, I claim constructing the cylinder, A, or pump, a', or both, of sheet metal, in the manner and for the purpose herein set forth.

Fifth, I claim, in connection with the last, the ventilated jacket or protection, A3, constructed and arranged substantially in the manner herein set forth.

Sixth, I claim the within-described arrangement of the bonnet, Q, and the valves, F and G, with their seats and passages cast on the cylinder, and arranged substantially in the manner and for the purposes herein set forth.

50,062.—Hot-air Engine.—Stephen Wilcox, Jr., Westerley, R. I.:

First, I claim the pipe, 3, connecting the interior of the furnace, B, with the upper portion of the reservoir, 1, for the purposes herein set forth.

Second, I claim the loaded piston, t, in combination with the cock, 4, adapted to regulate the area of the orifice in the cock, 4, through which the petroleum flows from the reservoir, I, to the furnace, B, according to the fluctuations of pressure obtaining in the furnace, B, substantially as and for the purpose herein set forth.

Third, I claim the arrangement of the heat-conducting spurs, 13, burner, 9, and evaporator, 12, substantially as and for the purposes herein set forth.

Fourth, I claim connecting and combining the fly ball or equivatent speed governor, R, with the piston, 11, or its equivalent, for controlling the issue of hydro-carbon vapor into the furnace of an air engine, substantially as and for the purpose herein specified.

Fifth, I claim, in combination with an air engine adapted for the use of hydro-carbon vapor in the manner substantially as specified, the jet-holes, 10, and one or more pistons or stops, 11, arranged immediately adjacent thereto, so as to jet with the full velocity, even when partly closed, all substantially as and for the purposes herein set forth.

Sixth, I claim the employment in an air engine of an elevated reservoir, 1, evaporating device, 12, and a regulating device, 11, acting on the hydro-carbon after its change to the vaporous form, the several parts being arranged to operate together substantially in the manner and for the purposes described.

Seventh, I claim the arrangement of the vapor burner 9, metallic globe, 14, fresh-air passages, 20, and jets, 10, relatively to each other and to the evaporating pan, 12, or its equivalent, adapted to receive heat from the metallic globe, 14, substantially in the manner and for the purposes herein set forth.

50,063.—Bottle Stopper.—J. A. and G. E. Woodbury, East Cambridge, Mass.:

First, We claim the hinged disk, B, provided with the packing, e, and hasp, C, or their equivalents, in combination with the wire, F, applied to the mouth and neck of a bottle, substantially as and for the purpose described.

Second, The fixed ring or seat, M, provided with lugs, n n, projection, h, and packing, e, and hinged to the disk, B, substantially as set forth and for the purpose described.

Third, Forming of the twisted ends, h, of the wire, F, a catch for the hasp, C, substantially as described.

50,064.—Seat for Water Closets.—Eber Woodruff, Chicago, Ill.:

First, I claim the combination and arrangement of the hinged seat, D, and pivoted cover, C C, when operating substantially as and for the purposes specified.

Second, The combination and arrangement of the hinged seat, D, and pivoted cover, C C, and wedge shape pieces, I and J, when arranged and operated substantially as and for the purposes herein described.

50,065.—Seed Planter.—Alpheus Bugbee (assignor to himself and Andrew J. Foster), Elkhart, Ind.:

First, I claim the construction and combination of the spurs, F, with the carriage axle or single shaft, B, to operate the seeding slide and agitate the grain, as herein described.

Second, I also claim suspending the teeth, C, at their backside to the rear ends of the arms, I, as described.

Third, I also claim the arrangement, construction and combination of the plates, U, with their vibrating bar, W, operating in a slotted V-shaped hopper, S, as herein described, for the purpose of sowing grass seeds.

50,066.—Harvester Rake.—Wm. F. Cochrane (assignor to himself, B. F. Warder and J. C. Child), Springfield, Ohio:

First, I claim the combination of the goose-neck or arched rake arm, having both a vertical and a horizontal turning movement on its pivot, with the guide slot and switch latch, substantially in the manner and for the purposes described.

Second, The combination of the guide slot, the switch and the goose-necked vibrating sweep rake with the mechanism for driving said rake, when arranged and operating substantially as and for the purposes set forth.

Third, The combination of the rake head, swivel ring and adjusting washers, arranged and operating as described.

50,067.—Paint Brush.—Samuel P. Faught, Foxboro, Mass., assignor to himself and William T. Cook, Boston, Mass.:

I claim the double socket, A, provided with a partition, a, in combination with the conical wedge, D, and screw, e, substantially as set forth.

50,068.—Paint Compound.—Darwin P. Flinn, Geneva, N. Y., assignor to Wm. S. Miller, New York City:

I claim a paint composed of oxide of zinc, lime, resin, linseed oil and milk, in about the proportions herein specified.

50,069.—Heat Radiator for Stove Pipes.—N. F. Goodrich, Meriden, Conn., assignor to himself and Isaac L. Holmes, Haydenville, Mass.:

I claim the central pipe, C, provided with a damper, D, in combination with the pipes, B, and chambers, A A, all arranged substantially as and for the purpose specified.

[This invention relates to a new and useful improvement in a heat radiator for stove pipes, and is a good, simple and economical device for the purpose.]

50,070.—Brick Machine.—Isaac Gregg (assignor to Isaac Gregg, Jr.), Philadelphia, Pa.:

First, I claim starting the pistons or followers of the molds, together with their contained bricks, separately or in succession, by means of the inclined, B B', or their equivalents, acting upon the stems, a, of the said pistons, substantially in the manner described, for the purpose of saving power and relieving the lifting levers of the said brick machine from the great strain consequent upon their starting, and lifting, as heretofore, the whole of one set of the pistons and bricks at one operation.

Second, I claim periodically changing the direction of the current of clay in the hopper from the set of filled molds to the set of empty ones under the hopper by means of the moving partition, c', or its equivalent, operating substantially in the manner described, for the purposes specified.

Third, I claim the arrangement of the steam-heating chambers, D D, in combination with the plates, d2 d2, near the ends of the hopper, C, substantially as and for the purposes described.

Fourth, I claim giving the described alternating motions forward and backward to the two lubricating sweeps or mold clearers, E E' by means of the divided rock shafts, M M', and pinions, m2 m3, or their equivalents, arranged to operate the said sweeps or mold clearers, as and for the purpose described.

Fifth, I also claim controlling or starting or stopping the machine at will, by means of the apparatus consisting of the hand wheel, H, rollers, K and o, ratchet wheel, K', pawl, K2, treadle, N, and cord, P, supported in a suitable frame, L, and connected with the friction roller, G, by means of the cords, P' p, or their equivalents, so as to operate substantially as described and set forth.

50,071.—Cooking Stove.—Marcus L. Horton, Claremont, N. H., assignor to Sidney Smith, Greenfield, Mass.:

I claim the open space, D, and apparatus and register, A, as ar-

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ranged and in combination, operating as described and for the purposes set forth.

50,072.—Cooking Stove.—Marcus L. Horton, Claremont, N. H., assignor to Sidney Smith, Greenfield, Mass.:

I claim the E, with cap, A, and improved flue, C, as arranged and in combination, operating as described and for the purposes set forth.

50,073.—Coal Stove.—Zebulon Hunt, Hudson, N. Y., assignor to himself and Wm. J. Miller:

First, I claim the double flue, D D', in combination with the circular hot-air chamber or flue, F, when both are constructed and arranged in manner and for the purpose set forth.

Second, I also claim the bridge flue, H, in combination with the circular flue, G, when arranged substantially as and for the purpose set forth.

50,074.—Machine for Shaping Crimping Forms.—J. H. Jellison (assignor to C. and J. R. Pierce & Co.), Milford, Mass.:

I claim the combination and arrangement of the rotary cutter wheel, A, and its shaft, with the mechanism, substantially as described, for moving such cutter head vertically, either slowly or suddenly, as may be required, the whole being applied to a table, as explained.

I also claim the combination of the rotary cutter wheel, its shaft, the mechanism for moving the wheel vertically, as set forth, and the two carriers, E and F, made substantially as specified.

50,075.—Gas Burner.—Hugh L. McAvoy (assignor to himself and E. S. Hutchinson), Baltimore, Md.:

I claim the gas burner provided, as described, with three or more parallel or nearly parallel slits.

50,076.—Apparatus for Carbureting Air.—Hugh L. McAvoy (assignor to himself and E. S. Hutchinson), Baltimore, Md.:

I claim, First, The described gearing and shafting by which the motor shaft, O, is connected with the forcing wheel shaft, F, through a point in the side of the chamber above the fluid level.

Second, The air pipe, R, which supplies the air to wheel from the chamber in which the regulator operates.

Third, The described form of regulator, inclosing an air space between a cylinder and conical frustrum, and whose sectional area of displacement is increased as it sinks in the fluid.

Fourth, The automatic valve, d, in combination with the chamber, A, pipe, c, and supply pipe, R.

Fifth, The valve, I, suspended from the regulator and controlling the lower orifice of the pipe, H, which supplies carbureted air to the regulator.

Sixth, The reservoir, Y, situated above the gas-generating chamber, and communicating therewith by the pipe, Z, guarded by the valve float in the chamber, D.

Seventh, The combination of the upper reservoir, Y, chamber, A, and regulator, B C, with the lower chamber, D, and air-forcing wheel, E, communicating with each other by the passages for fluid, air and carbureted air, substantially as described.

50,077.—Apparatus for Purifying Kaolin, Etc.—Thomas Moore, Cornwall, Conn., assignor to John Ellerby, New York City:

First, I claim passing the mineral to be dressed, in connection with a current or currents of water or other suitable liquid, through a drag or drags, or their equivalents, having a series of one or more flood gates arranged in such a manner as to be opened and closed at pleasure, by means of which gates the said passage of the water with the mineral can be regulated according as may be necessary, substantially as herein described.

Second, Delivering the mineral, after having been dressed, in any proper manner, to one or more suitable receivers or tanks at or near the bottom thereof, substantially as and for the purpose specified.

Third, Removing the clay from the receivers of the cleansing or dressing apparatus, through any suitable opening or openings in the bottom of the same, substantially as set forth.

50,078.—Rocking Horse.—Leven C. Percival (assignor to himself and E. H. Deemer), Philadelphia, Pa.:

First, I claim the hobby horse constructed substantially as denoted—that is to say, supported underneath by a pivoted attachment to a standard erected on the wheeled platform, the hind feet attached to the crank on the rear axle, while the forward parts are left free, substantially as described.

Second, The guiding bridle line connecting from the bit to a place near the pivotal point of the horse, and from thence with the forward axle, as described.

Third, The use of the swinging frame, x x, for lifting the platform, arranged as described, and for the purpose specified.

[This invention relates to a novel arrangement of a rocking horse, by the rocking movement of which its carriage is propelled, and consists principally in the steering devices for guiding the carriage in any desired direction, and also in the use of frames connected in such manner to the carriage that its wheels can be lifted from the ground, and thus the propulsion of the carriage prevented as the horse is rocked.]

50,079.—Leather Roller.—D. H. Priest (assignor to himself and B. S. Harrington), Boston, Mass.:

I claim, First, So applying the adjustable table as to allow it to rise and fall automatically with the various depths of skin about the roller or shaft.

Second, I claim the combination of the toggles and the levers with the adjustable bed, provided with a feeding roller and the winding roller or shaft.

50,080.—Cotton Gin.—Francois Durand (assignor to E. P. H. Gondonin), Paris, France:

I claim, First, The combined operation and arrangement of the two ginning rollers, i and i', the surface of the roller, i, of which is provided with a series of inclined annular or endless elliptical corrugations or grooves, situated parallel to each other and the surface of the other roller, i', being smooth, the said corrugated or grooved roller acting in combination with the smooth ginning roller, i', provided with a slip of parchment, substantially in the manner and for the purposes set forth.

Second, In combination with the rollers, i i', the general arrangement and combination of the parts, acting in concert therewith, substantially as described and illustrated in the annexed drawings, and for the purposes set forth.

50,081.—Process of Collecting Spirit During the Refining of Sugar.—Francis Reid, Liverpool, Eng. Antedated June 21, 1865:

I claim solely the collecting and saving of such spirit or alcohol as may be generated and thrown off during the process of boiling or refining raw sugars, concrete, melado and molasses, substantially in the manner and for the purposes hereinbefore described and set forth.

50,082.—Manufacture of Gun Cotton.—J. J. Revy, Vienna, Austria:

I claim an explosive compound, made substantially in the manner and for the purposes described.

50,083.—Manufacture of Gun Cotton.—J. J. Revy, No. 28 Grosvenor Street, Eaton Square, Eng.:

I claim, First, The preparing the cotton for use, in the manufacture of gun cotton, by washing it in an alkaline solution.

Second, The process of dipping or steeping the cotton, as hereinbefore set forth, small and regular quantities of the cotton being dipped, one after the other, in a dripping vessel containing a considerable quantity of acid, the contents of which are, after each operation, brought back to the proper strength by the addition of fresh acid, to compensate for that removed by the portion of cotton last dipped.

Third, The general arrangement of the apparatus hereinbefore described and shown in the annexed drawings.

Fourth, The separating the acid from the exterior of the gun cotton fiber by saturating the cotton with water and then again extracting this water by means of a centrifugal machine. Also the separation of the acid from the interior of the gun-cotton fiber by arranging the cotton in layers on suitable perforated shelves and causing water to filter or percolate through it.

Fifth, The treating gun cotton with water glass by means of a centrifugal machine, as hereinbefore described.

Sixth, The employment for treating gun cotton, of water-glass solution, in a cool, in place of in a boiling, state, as heretofore.

50,084.—Mode of Making Bars, Shafts, and Other Articles Composed of Iron and Steel.—Charles Sanderson, Sheffield, Eng.:

I claim the manufacture of railway bars, shafts, girders, ship plates, boiler and bridge plates, and other articles, from masses of wrought iron and cast steel, or of wrought iron and homogeneous iron or steel (made by, and known as, the Bessemer or pneumatic process), and the uniting of large masses of the above metals, in which the combination is effected, in the manner herein described.

50,085.—Apparatus for Preserving Beer and Other Liquids.—Thomas Byrne, New York City:

I claim, First, The preservation of liquids or liquors on draught, substantially as and for the purpose herein set forth.

Second, The application of a flexible vessel for containing, and from which to serve, liquors on draught, substantially as described.

50,086.—Chimney Cap.—E. Hinkley and G. W. Crowell, Cleveland, Ohio:

We claim the cap, A, the standard, D, and link, b, in combination with the plate, C, the several parts being constructed and arranged as and for the purpose herein set forth.

REISSUE.

2,073.—Manufacture of Iron.—John D. Williams, Alleghany City, Pa. Patented Aug. 8, 1865. Antedated July 9, 1865:

I claim the use of the ingredients herein named, and their equivalents, and the mode of using them, and the manner of operating the furnace, substantially as described, and for the purpose set forth.

DESIGNS.

2,173.—Bust of Abraham Lincoln.—Henry Manger, Philadelphia, Pa.:

2,174.—Carpet Pattern.—Elemir J. Ney (assignor to the Lowell Manufacturing Company), Lowell, Mass.

2,175.—Carpet Pattern.—Elemir J. Ney (assignor to the Lowell Manufacturing Company), Lowell, Mass.

2,176.—Carpet Pattern.—Elemir J. Ney (assignor to the Lowell Manufacturing Company), Lowell, Mass.

PATENTS

GRANTED

FOR SEVENTEEN YEARS.

MUNN & COMPANY,

In connection with the publication of the SCIENTIFIC AMERICAN, have acted as Solicitors and Attorneys for procuring "Letters Patent" for *new inventions* in the United States and in all foreign countries during the past *seventeen years*. Statistics show that nearly ONE-HALF of all the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after *eighteen years'* experience in preparing specifications and drawings for the United States Patent Office, the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office; but they take pleasure in presenting the annexed testimonials from ex-Commissioners of Patents.

MESSRS. MUNN & CO.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours very truly,

CHAS. MASON

[See Judge Holt's letter on another page.]

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

MESSRS. MUNN & CO.:—It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, your obedient servant,

WM. D BISHOP.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service which Messrs. MUNN & CO. render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there; but is an opinion based upon what knowledge they may acquire of a similar invention from the records in their Home Office. But for a fee of $5 accompanied with a model, or drawing and description, they have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, etc., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through the Branch Office of Messrs. MUNN & CO. corner of F and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue. Address MUNN & CO., No 37 Park Row, New York.

The Patent Laws, enacted by Congress on the 2d of March, 1861, are now in full force and prove to be of great benefit to all parties who are concerned in new inventions.

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners, except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat is $10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

INVITATION TO INVENTORS.

Inventors who come to New York should not fail to pay a visit to the extensive offices of MUNN & CO. They will find a large collection of models (several hundred) of various inventions, which will afford them much interest. The whole establishment is one of great interest to inventors, and is undoubtedly the most spacious and best arranged in the world.

UNCLAIMED MODELS.

Parties sending models to this office on which they decide not to apply for Letters Patent and which they wish preserved, will please to order them returned as early as possible. We cannot engage to retain models more than one year after their receipt, owing to their vast accumulation, and our lack of storage room. Parties, therefore, who wish to preserve their models should order them returned within one year after sending them to us, to insure their obtaining them. In case an application has been made for a patent the model is in deposit at the Patent office, and cannot be withdrawn.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

FOREIGN PATENTS.

Messrs. MUNN & CO., are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business they have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. They think they can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through their agency.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Pamphlets of information concerning the proper course to be pursued in obtaining patents in foreign countries through MUNN & CO.'S Agency, the requirements of different Government Patent Offices, &c., may be had, gratis, upon application at the principal office, No. 37 Park Row, New York, or any of the branch offices.

SEARCHES OF THE RECORDS.

Having access to all the official records at Washington, pertaining to the sale and transfer of patents, MESSRS. MUNN & CO., are at all times ready to make examinations as to titles, ownership, or assignment of patents. Fees moderate.

ASSIGNMENTS OF PATENTS.

The assignment of patents, and agreements between patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft or Postal Order on New York, payable to the order of Messrs. MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

REJECTED APPLICATIONS.

Messrs. MUNN & CO. are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of their Washington Agency to the Patent Office affords them rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Their success in the prosecution of rejected cases has been very great. The principal portion of their charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with MUNN & CO., on the subject giving a brief history of the case, inclosing the official letters, etc.

MUNN & CO. wish it to be distinctly understood that they do not speculate or traffic in patents, under any circumstances; but that they devote their whole time and energies to the interests of their clients.

Patents are now granted for SEVENTEEN years, and the Government fee required on filing an application for a patent is $15. Other changes in the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

EXTENSION OF PATENTS.

Many valuable patents are annually expiring which might readily be extended, and if extended, might prove the source of wealth to their fortunate possessors. Messrs. MUNN & CO. are persuaded that very many patents are suffered to expire without any effort of extension, owing to want of proper information on the part of the patentees, their relatives or assigns, as to the law and the mode of procedure in order to obtain a renewed grant. Some of the most valuable grants now existing are *extended patents*. Patentees, or, if deceased, their heirs, may apply for the extension of patents, but should give ninety days' notice of their intention.

Communications and remittances by mail, and models by express (prepaid) should be addressed to MUNN & CO. No. 37 Park Row, New York

Back Numbers and Volumes of the "Scientific American."

VOLUMES IV., VII., XI. AND XII., (NEW SERIES) complete (bound) may be had at this office and from periodical dealers. Price, bound, $3 00 per volume, by mail, $3 75 which includes postage. Every mechanic, inventor or artisan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding VOLS. I., II., III., V., VI., VIII., IX. and X., are out of print and cannot be supplied.

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Notes and Queries

Mechanic.—It is not uncommon for "doctors" used in turning shafting to vary the size of the work. It would seem that if the tool were started true and were well fitted that the shaft would be uniform except in the wear of the cutter. It is not so, and irregularities are often caused by taking too much cut; by small pieces of iron getting caught in the parts that fit the shaft Too much cut is a frequent cause of trouble; 1-32d is ample to remove at the last finish if the work has been well roughed off.

C. J. L., of Ill.—Mr. Jurgens's magnet would tend to stop the rotation of his lower wheel rather than prolong its revolutions.

S. C., of Ky.—It has been questioned whether a message was ever transmitted by the first Atlantic cable, but no one who has examined the evidence has any doubt on the subject. A considerable number of messages were sent before the cable gave out. Water is slightly compressed by great pressure, but not enough to float the cable—it goes to the bottom. All your suggestions have been very thoroughly considered by able electricians. In writing for 40,000 people to read you should never write hastily—it is inexcusable.

E. H. M., of Conn.—The French consul at this port would probably forward you all the information that you may wish in regard to the Paris International Exhibition of 1867.

S. A. W., of Mich.—Your explanation of the rolling of a glass rod toward the fire when resting near its end on two parallel bars has already been published. The heat expands the side next the fire, causing a curve, which drops down, thus rolling the rod.

J. W. B., of Ohio.—We have illustrated magneto-electric machines, invented by H. N. Baker, Binghamton, N. Y., and by Mr. Beardsley, of Greenpoint, L. I. They are also manufactured by B. Pike, Jr., of this city. The current is a succession of waves.

J. S. L., of Ill.—If you will send us an intelligible description of your drying house, carefully prepared, and legibly written in ink on one side of the paper, we will publish it.

F. N. B, of Cal.—We are unable to tell you in what number of the paper you will find the statement you refer to.

J. S. M., of Ky.—Any grease will make paper watertight. If you want something tasteless and free from any chemical action, probably paraffine would best answer your purpose.

A. H. T., of Pa.—Benjamin Pike & Sons, No. 518 Broadway, in this city, manufacture microscopes.

J. H. G., of N. Y.—Your plan for producing perpetual motion, by having a water-wheel pump up the water which passes through its buckets, to be used over again to drive the wheel, is one of the oldest schemes for perpetual motion. With a good overshot wheel you could raise about 70 per cent of the water, and with the very best turbine, 88 per cent.

A. B., of West Va.—It is not probable that the shale which you send contains any silver. It will cost you $5 to have the sample tested so as to settle the question.

A Subscriber, from Nantucket, sends us a good plan for unloading hay, which, we think, could be patented.

P. J., of Pa.—We received your drawings and money, which we acknowledged by letter, August 22 On the 1st of September we sent report of preliminary examination, also by mail; and we have lately written you again. Our letters were all directed as specified in your letter.

G. F. G., of N. J.—Putting out fires by steam is old. Operating railroad brakes by steam is also an old idea.

TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgement of our reception of their funds

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired

RATES OF ADVERTISING.

TWENTY-FIVE CENTS per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published we will explain that eight words average one line. Engravings will not be admitted into our advertising columns, and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

ANNULAR (DIAMOND) DRILL.—THE ANNULAR Drill Company, of New York, are now prepared to furnish their machines to order, for all purposes of mining, tunneling, quarrying and rock blasting. County and State Rights for sale. Subscriptions to a part of the working capital stock received at office of Riker & Co., No. 78 Broadway; Satterlee & Co., No. 70 Broadway; Morris & Wheelwright, No. 72 Beaver street, or at the Office of the Company, No. 10 Pine street. J. WALES, Treasurer. 1*

A PRACTICAL CHEMIST, FOR SEVERAL YEARS connected with a large manufacturing establishment, desires an engagement. Best references given. Address CHEMIST, Box 157, New York City. 1

OFFICE DEPOT COMMISSARY, FORT MONROE, Va., September 21, 1865.

GOVERNMENT SALE OF WHISKY.—SEALED PROPOSALS (in duplicate) are invited and will be received by the undersigned at this depot until 12 o'clock M on the 13th day of October, 1865, for the sale of one thousand seven hundred and fifteen (1,715) barrels of whisky, more or less, as follows, viz.:—

LOT No. 1.—Consisting of ten hundred and sixty seven (1,067) barrels of Rectified Whisky, originally inspected in April, May and June, 1864, and January, 1865, containing about forty two thousand three hundred and forty five (42,345) gallons. Proposals for ten (10) barrels and upward of this lot will be received.

LOT No. 2.—Consisting of four hundred and sixty (460) barrels of Pure Copper-distilled and Superior Bourbon Whisky, originally inspected in February, 1865, containing about eighteen thousand four hundred and ninety-eight (18,498) gallons. Proposals for five (5) barrels and upward of this lot will be received.

LOT No. 3.—Consisting of one hundred and twenty (120) barrels of Pure Rye Whisky, originally inspected in February, 1865, containing about four thousand eight hundred (4,800) gallons. Proposals for three (3) barrels and upward of this lot will be received.

LOT No. 4.—Consisting of sixty-three (63) barrels Pure Old Rye Whisky, originally inspected in February, 1865, containing about two thousand five hundred and twenty (2,520) gallons. Proposals for two (2) barrels and upward of this lot will be received.

LOT No. 5.—Consisting of five (5) barrels Pure Old Bourbon Whisky, originally inspected June, 1864, containing about one hundred and sixty-three (163) gallons. Proposals for one (1) barrel and upward of this lot will be received.

The whisky was originally selected with great care, and is all pure and of prime quality. The Rectified was designed for issue to the troops in the field, and the Bourbon and Rye for sales to officers, and are equal if not superior to any whiskies now in the market; has all been regaged within the present month, and is in excellent order, packages being of the best quality.

Samples of the whisky can be seen and blank proposals can be obtained at the offices of the following-named officers of the Subsistence Department, viz.:—

Colonel H. F. CLARKE, A. D. C. and A. C. G. S., New York.
Brevet Brigadier-General THOS. WILSON, C. S., Baltimore, Md.
Major GEORGE BELL, C. S., Washington, D. C.
Captain THOMAS C. SULLIVAN, C. S., Richmond, Va.
Captain E. D. BRIGHAM, C. S., Boston, Mass.
Captain J. B. WIGGINS, C. S., Philadelphia, Pa.

The Government reserves the right to withdraw any or all of the above lots, and to reject any proposals deemed too low.

Payment to be made in United States currency within ten (10) days after notification of acceptance of bid and prior to delivery of the property.

A guaranty equal to one-half the amount proposed for must accompany the bid, signed by two (2) responsible parties.

When removing the whisky, purchasers will provide their own transportation, and the Government will load the vessels free of wharfage, dockage, or labor.

Bidders are invited to be present at the opening of their proposals, Brevet Brigadier-General Joseph Roberts, U. S. A., commanding at Fort Monroe, Va., or some other officer of rank, will be present at the opening of bids to represent absentees.

14 2 JAMES CURRY, Colonel and C. S. V.

THE SUBSCRIBER IS PREPARED TO FURNISH at short notice, of all sizes, the Andrews & Ralbach water-wheels, which gave 84·97 per cent effective force at Fairmount test, Philadelphia, March, 1860; the Risdon Self-acting Circular Sawing Machines, of all sizes, the best in use for cutting logs into all sizes of lumber. Also, all kinds of mill work.

THEODORE H. RISDON, 14 3* Mt. Holly, N. J.

SEINE-NETTING MACHINE WANTED—ONE NETTING the proper stitch only. Address

J. D. N., Greenpoint, 1* Suffolk Co., L. I.

MAGIC LANTERNS.—OXY-CALCIUM LANTERNS; Oxy-hydrogen Stereopticons. A priced and Illustrated Catalogue sent free by mail on receipt of application.

WILLIAM Y. McALLISTER, 14 3 No. 728 Chestnut street, Philadelphia, Pa.

WANTED—A SITUATION BY A MECHANICAL Engineer, who was engaged before the war in the sale of steam engines and machinery. Is competent to make the necessary plans and estimates for locating new machinery and superintending the erection. Address A. B., P. O. Box 2,178. 14 3*

$5,000 A YEAR.—AGENTS WANTED TO sell on commission. Address 1* S. H. SAYER, Otisville, N. Y.

CHARLES A. SEELY (LATE PROFESSOR OF Chemistry and Toxicology in the N. Y. Medical College), Consulting and Analytical Chemist. Analyses of Articles of Commerce, Medicines, Ores, Minerals, Etc. Advice and Reports on New Inventions, Instruction in Chemical Processes, Etc. 14 3*

GREAT CHANCE TO MAKE MONEY—NEVER known to fail. Fine samples will be sent by mail on receipt of $1. Send on your orders early. Address A. SUNDERLIN, Sunderlinville, Pa. 1*

H. C. FREEMAN, CIVIL AND MINING ENGINEER and Geologist.—Has 15 years professional experience. Is acquainted with most of the Western States, West Virginia, and several Southern States. Best of references East and West. Address, until Oct. 10th, Pomeroy, Ohio. Home address, South Pass, Union Co., Ill. 14 4*

JUST PUBLISHED—THE INVENTORS' AND MECHANICS' GUIDE.—A new book upon Mechanics, Patents and New Inventions. Containing the U. S. Patent Laws, Rules and Directions for doing business at the Patent Office; 112 diagrams of the best mechanical movements, with descriptions; the Condensing Steam Engine, with engraving and description; How to Invent; How to Obtain Patents; Hints upon the Value of Patents; How to Sell Patents; Forms for Assignments; Information upon the Rights of Inventors, Assignees and Joint Owners; Instructions as to Interferences, Reissues, Extensions, Caveats, together with a great variety of useful information in regard to patents, new inventions and scientific subjects, with scientific tables, and many illustrations. 108 pages. This is a most valuable work. Price only 25 cents. Address MUNN & CO., No. 37 Park Row, N. Y. 14 tf

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THOMAS C. THEAKER.

The Hon. Thomas C. Theaker, who has just been appointed by President Johnson Commissioner of Patents, is emphatically a self-made man. His education—eminently qualifying him for the honorable and responsible position he now occupies—has been acquired in the workshop. Though a practical mechanic, of great and varied experience, he has all his life aimed at something higher than mere practical skill as an artisan, and has made himself a proficient in the *science* of mechanics. He is an inventor, also, and has, previous to his official connection with the Patent Office, taken out several patents for ingenious and useful improvements in the mechanic arts.

Mr. Theaker's past history gives an assurance to that valuable class of our fellow-citizens with whom the great majority of useful inventions originate—the mechanics, artisans and workingmen—that his sympathies will always be with them, and that the interests of inventors will be safe in his hands.

Aluminum.

Dr. N. C. Fowler, of Yarmouth, who has been experimentally working in aluminum for several years, exhibits, at the Boston Fair, many articles of dentistry and ornamental work fabricated from that new material. His specimens were reduced from Cape Cod clay by himself, and attest in a remarkable manner the hardness and strength, as well as the lightness and material, of this singular metal, the processes of working which are in such singular contrast with the methods of treating other minerals. It is not oxidizable, and its specific gravity is below that of rubber, 25 sheets of aluminum, which Dr. Fowler exhibits, weighing but five-eighths of a grain, while the same number of gold sheets of equal size weigh six grains. Some beautiful specimens of embossing with this material are shown.—*Boston Advertiser.*

[Aluminum is less readily attacked by acids than most metals, but it is not strictly true that it is not oxidizable. A considerable portion of every brick wall and every bank of clay is the oxide of aluminum. Clay is the silicate of alumina—silex and alumina—and alumina is the oxide of aluminum.—EDS. SCI. AM.

HON. THOMAS C. THEAKER.

Mr. Theaker was born on the first of February, 1812, in York County, Pennsylvania. In 1830, when eighteen years of age, he removed with his father's family to Belmont County, Ohio. Soon afterward he became a house carpenter and joiner, commencing his apprenticeship to the business in Zanesville, Ohio, and concluding it in Wheeling, Virginia. While still quite young, he learned, also, the art of machine pattern making. Subsequently he became a skillful millwright, which business he successfully followed a number of years in various parts of Ohio. About twenty years ago, Mr. Theaker established an engine and machine shop at Bridgeport, Belmont County, Ohio, and carried on the business some twelve or fifteen years, giving all the various branches of work there done his personal supervision, and becoming master of all.

In the fall of 1858, Mr. Theaker was elected to Congress from the Belmont district, and was a member of the House of Representatives during the two stormy sessions which immediately preceded the breaking out of the late rebellion.

On the incoming of Mr. Lincoln's Administration, he was strongly recommended by numerous members of Congress with whom he had served, and others, for the office to which he has just been appointed; but, on the accession of Mr. Holloway to that place, he accepted an appointment tendered him by the President on the Board of Examiners-in-Chief, which had just been created by an act of Congress. In that capacity, as most of our readers are aware, he has served with ability ever since.

ON the 4th inst., a rope swinging from a water tank on the Chicago and Northwestern Railroad, by a curious result of the laws of motion, wound itself around the neck of N. W. Danks, of Chicago, who was standing on the platform of a car looking off, and as the train dashed by he was jerked off and hung suspended till the train passed by, when the rope unwound and he fell to the ground insensible, but was restored to consciousness. So relates a Chicago paper.

IN a vacuum, all electrified bodies speedily lose their excitement, while in a dry, dense air, they retain it longest. Nevertheless, slight electrical excitement can be produced in a vacuum by friction.

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